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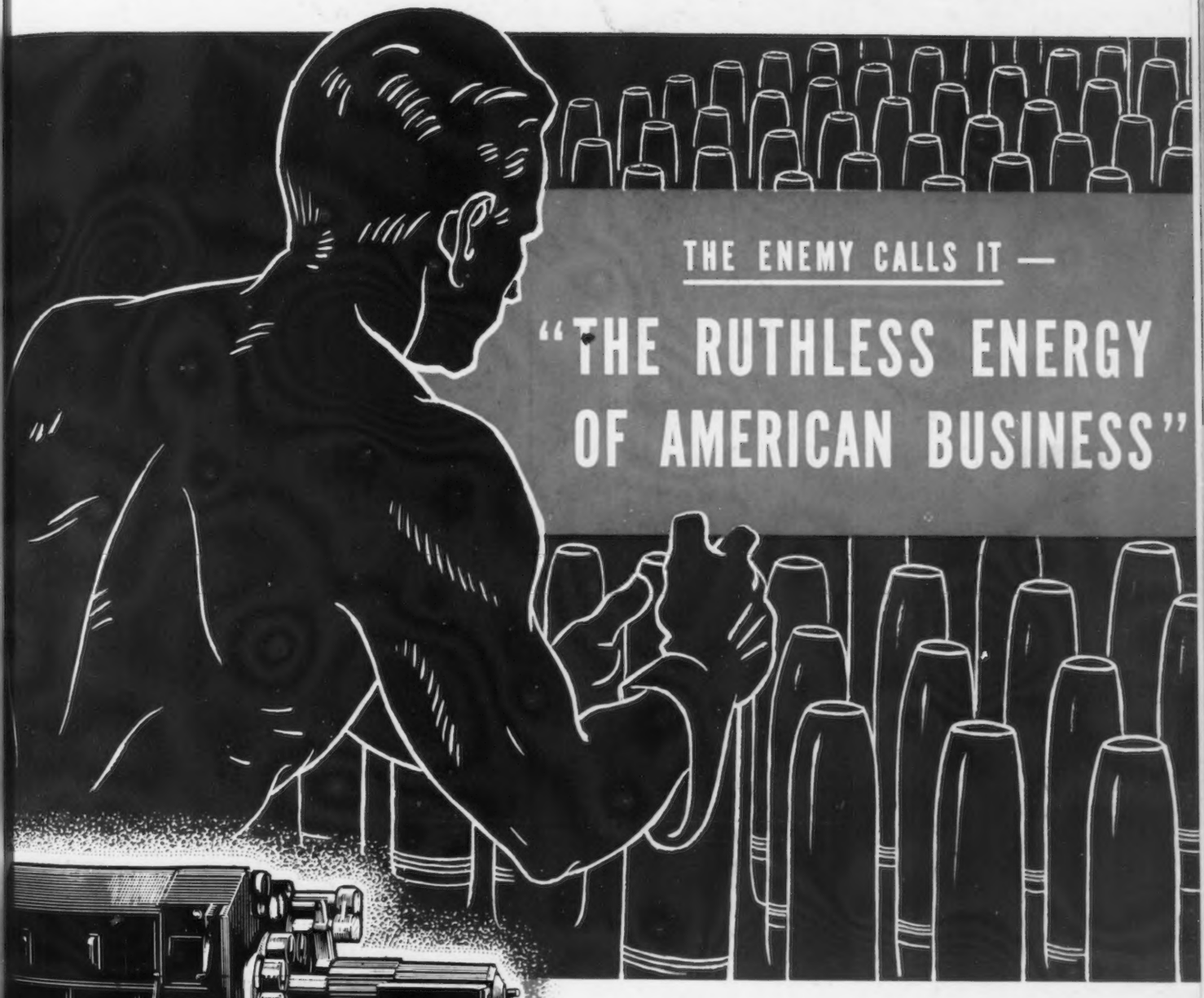
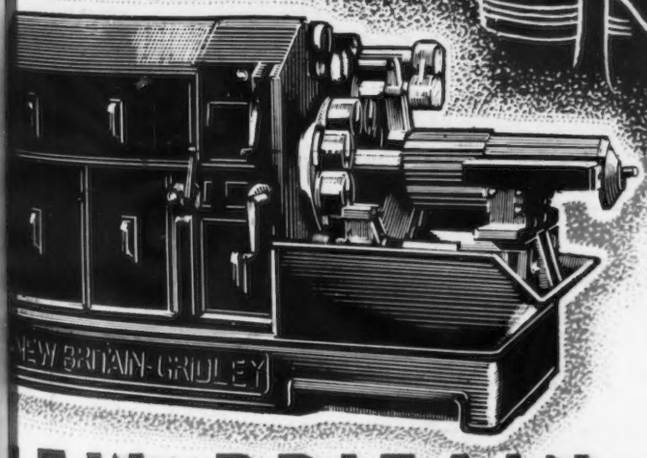
AUGUST 27, 1942

# The IRON AGE





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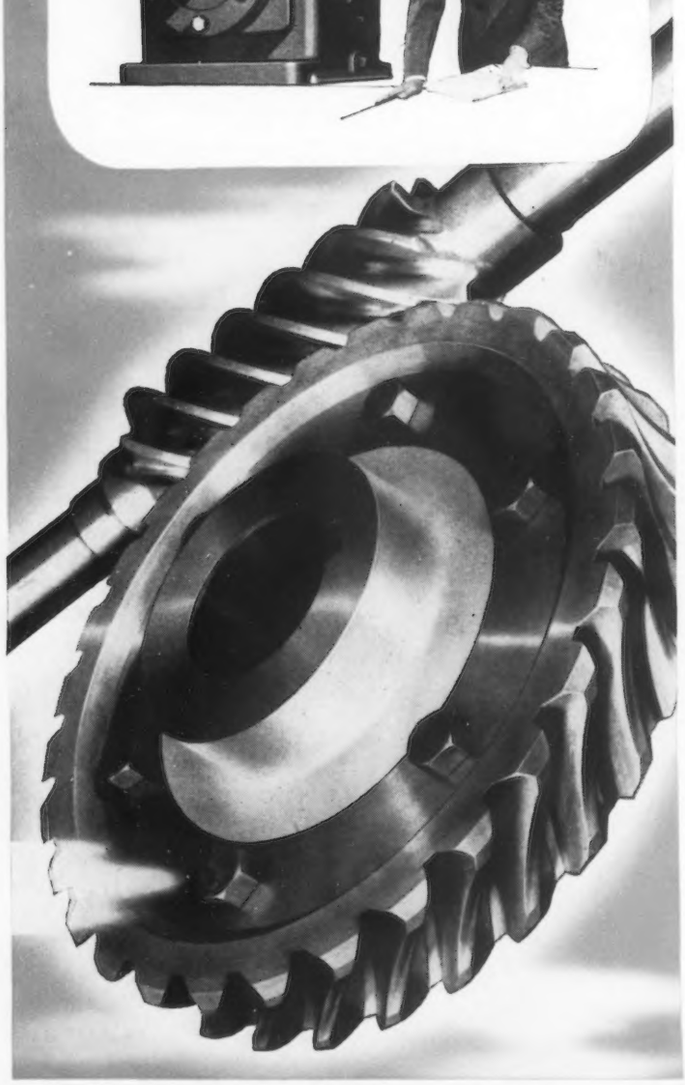

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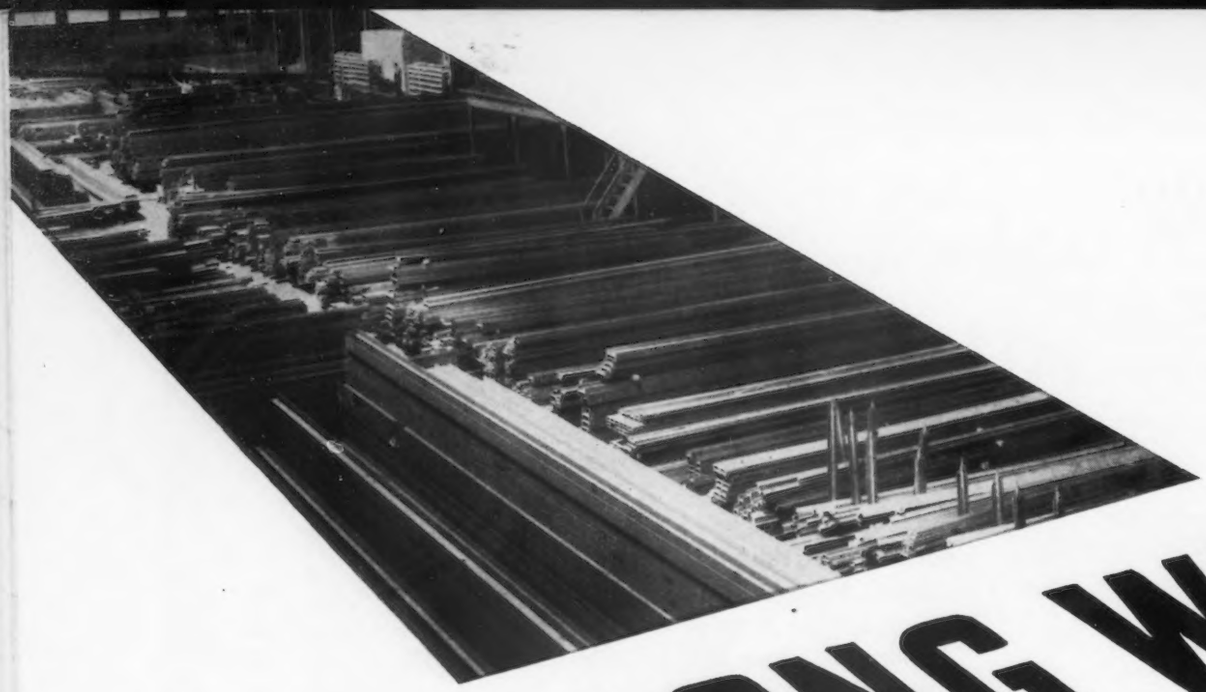

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# *from* RAW STEEL *to the* BATTLE LINES!

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THE IRON AGE

AUGUST 27, 1942

ESTABLISHED 1855

# Miracle Men Don't Happen

AMERICANS are, as a whole, enthusiastic, impetuous and impatient. They believe in miracles. And in miracle men.

"Look at Henry Ford," they say. "There is a miracle man for you. He built one of the greatest industrial plants of all time from a small blacksmith shop in little more than a quarter of a century."

"Look at Charley Schwab. There was another miracle man. He organized and built the two largest steel companies in the world, U. S. and Bethlehem."

"Look at Thomas Edison, the great inventor. Miracles were his specialty. He waved his wand and out of the hat came the phonograph, the incandescent lamp, the motion picture industry and a thousand new products."

"Why can't we get miracle men such as these in Washington to take charge of our war production program," people ask. "You wouldn't hear any more about shortages and bottlenecks if we could find such men and put them to work for us."

Now there is this fact that must be recognized about miracle men. They do not just happen. They are made.

Some of them, the real miracle workers whose works endure, are self made. Others are built by printers' ink. Beware of the latter or you may find you are helping to build another ballooning Insull edifice whose foundation is on sand instead of rock.

It takes time to make a genuine miracle worker. Time and environment.

Ford, Edison and Schwab did not flash meteor-like upon the American horizon overnight. They did not build their businesses or their reputations overnight. They did not do it in a month, a year, or two years. It took them each at least 10 years of hard and brilliant effort to carve their initial niches in the hall of accomplishment. And we are impatient because in one year, our men in Washington have not completed an industrial edifice a thousand times larger and more complex than any private industrial undertaking.

And it takes environment to make miracle workers perform. Environment in which they can produce their best. In which their initiative and abilities have full play, unhampered by the shackles of petty jealousies and partisan politics.

If we could summon Ford, Edison, Schwab and other of our past and present miracle workers and send them to Washington to manage war production, they could not accomplish one whit more than the excellent men who are working for us there today. The Washington environment is not conducive to the production of industrial miracles. You cannot do good work where there is no elbow room and where the congestion of authority is such that people are continually treading upon one another's toes.

Overcentralization is always detrimental to efficiency. Chicago would be a better location for the WPB than the Nation's Capital, and New York better for the OPA. We *have* real miracle workers now but they cannot produce their best miracles in the suffocating hot-bed of political intrigue and position jockeying. Get them away from this, and arm them with the authority to decide and act, and you will see real miracles made in short order.

J. H. Van Deventer

*"Gertie" was cut up and fed to the Inland furnaces the day she arrived at the mills.*

# "Old Gertie" Goes to War

## Inland Mine Hoist Makes Scrap for Hungry Furnaces

To help meet the critical need for scrap, an auxiliary mine hoist once affectionately known as "Gertie," was taken out of retirement at one of the Inland ore mines and shipped to the company's mills at Indiana Harbor. The need for scrap is so urgent that "Gertie" was cut up and fed to the hungry Inland furnaces the day she arrived at the mill. She was rolled into steel plates and soon will be part of a Liberty ship carrying vital war supplies to the fighting fronts.

"Gertie" is typical of many pieces of equipment in factories, mines, etc. throughout the country. Replaced by a modern electric hoist several years ago, this old mine hoist was stored because it "might come in handy some day." Holding old machinery, stacks, tanks, tools, jigs, dies, even partly finished parts, for possible future use is a commendable practice in ordinary times. But this is war—*total war*—and everything made of steel, that is not being used to produce for war, ought to be scrapped and started on its way to the steel mills at once.

Many steel mill furnaces are down, while millions of tons of needed scrap remain unreclaimed. The scrap situation is critical now and it will become more critical as winter approaches, unless management of American industry gives authority to scrap old equipment and materials.

If you can't use it *now*—scrap it.

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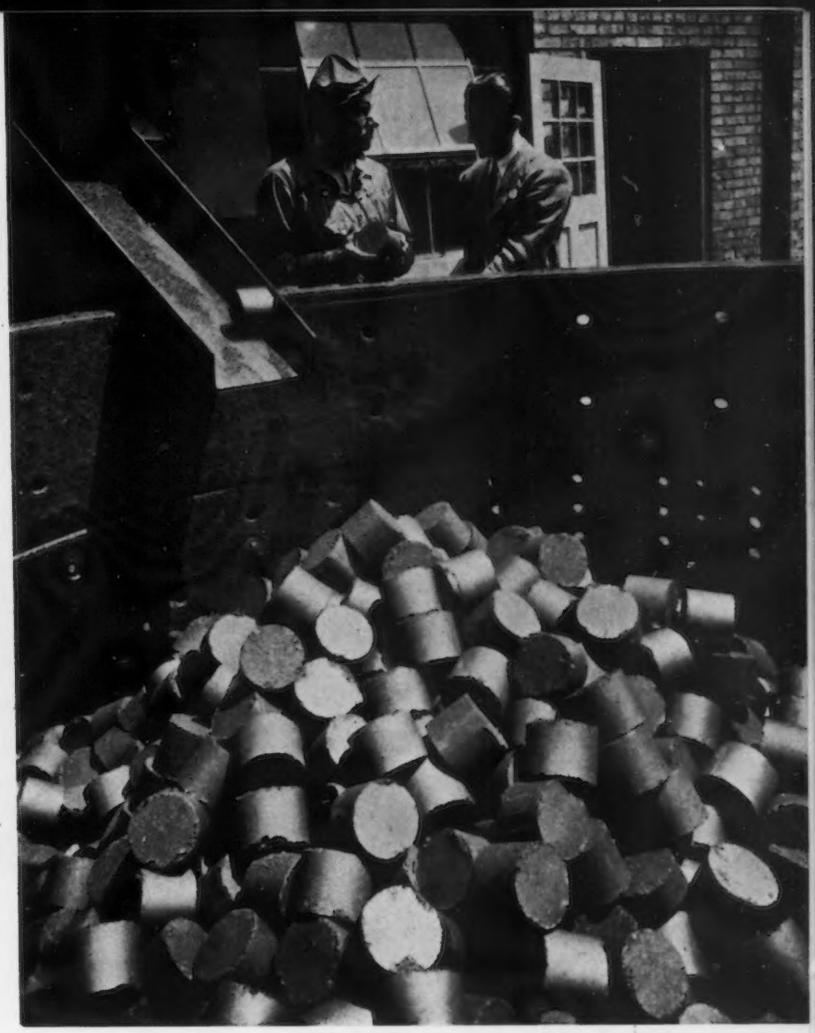
# Cupola Practice with Briquettes



By W. A. HAMBLEY and KENNETH GEIST
*Allis-Chalmers Mfg. Co., Milwaukee*

***. . . With many plants turning to cast iron and steel briquettes in an effort to make up the deficiency in normal scrap supplies, this review of cupola practice at Allis-Chalmers, where some 1500 tons of briquettes are used monthly, is especially timely. The authors discuss in this, the first of two articles, the segregation of borings and turnings, the briquetting press room setup, press maintenance, briquetting practice, costs, effect of oil on turnings, and making up charges. The second article will be published in a succeeding issue of The Iron Age.***

THE briquetting of steel turnings and cast iron borings, while not a new process, has increased by leaps and bounds in the last few years. While there were a few briquetting machines installed prior to 1938, installations since that time have quadrupled several times. The earlier installations were used mainly to briquette cast iron chips resulting from machining operations on castings. The shortage of many types of scrap normally used in melting has forced many plants to turn to briquetting to make available a new scrap source, a source which will, as the war production effort rises, produce tremendous tonnages of borings and turnings.

Many opinions have been expressed both pro and con as to the quantity of briquettes that can be used in a cupola charge. Many claims have been made as to costs, die replacement, scrap losses, melting losses or what have you. Many favorable comments have been heard, as well as many exaggerated tales, as to the unsuitability of the material.

In 1939 the Allis-Chalmers Mfg. Co., after careful consideration of the possible savings, installed its first briquetting press. This press was operated continuously three shifts a day, and from Nov. 1, 1939, to June 1, 1941, 8180 net tons of cast iron borings and 6402 net tons of steel chips were briquetted. The successful use of these materials in the cupola charges led to the installation of a second press.

Two briquetting presses are in operation at Allis-Chalmers at the present time. One runs continuously on crushed steel chips, while the other alternates on cast iron borings and steel chips. There is available around 600 tons of cast iron borings per month and over 1000 tons of steel chips from the machine shops. This amount of briquetted material has made the company's foundries independent of other sources of scrap and has enabled Allis-Chalmers to sell to steel plants its accumulations of plate and miscellaneous steel scrap.

The salvaging of cast iron borings from the various machine shops is done without any attempt to segregate the different classes of iron. This is done to keep the costs at a minimum as well as to facilitate handling. Since there are 12 machine shops working on the great variety of products that make up Allis-Chalmers' equipment for the agricultural, electrical and heavy industrial fields, any attempt at segregation of different irons would indeed be a costly operation. In all of these machine shops there

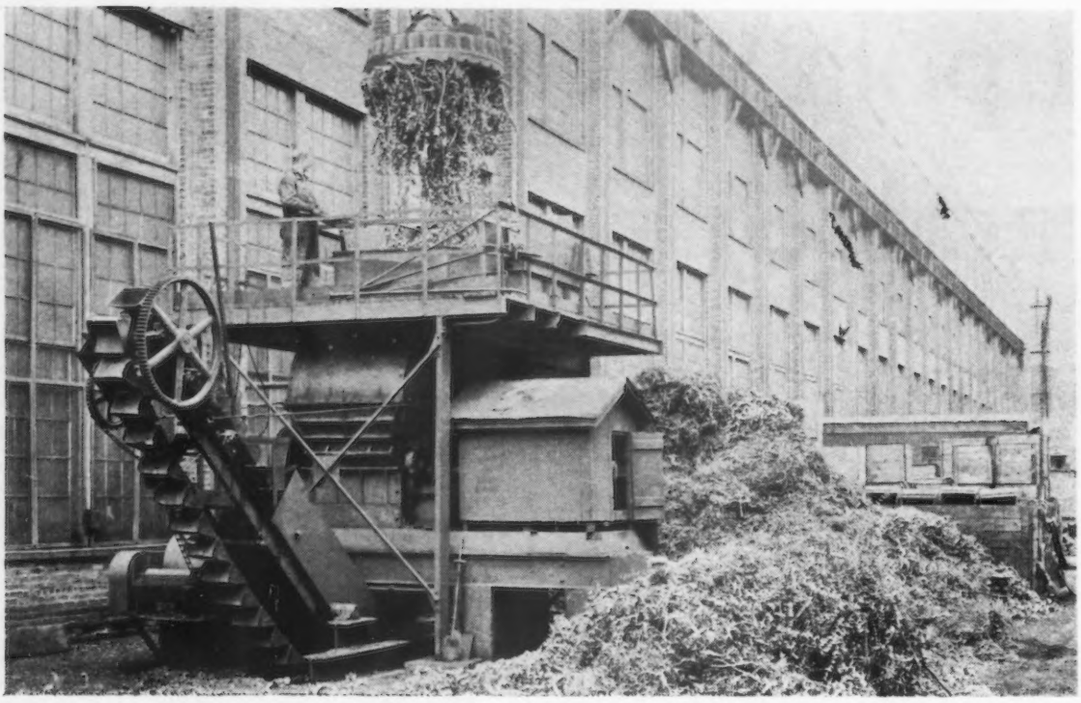


FIG. 1 — Machine used for crushing steel turnings into shorter lengths suitable for briquetting.

may be seen castings in process of machining, ranging from high test irons of high silicon, low carbon content, to soft, high silicon-high carbon irons, and including irons with silicon content varying from 0.90 per cent to 2.50 per cent.

Happily though, when the borings are all mixed, loaded in gondolas by magnet cranes and dumped into the hopper of the press, the average analysis remains constant, with the silicon content averaging 1.75 per cent and the carbon content 3.30 per cent. This is checked at intervals by melting a representative sample and analyzing it. No trouble has ever been encountered from segregation. As the proportion of alloy irons to base irons used here is small, the possibility of trouble from this source is minimized.

### Separation of Chips

Steel chips are salvaged under two broad headings, subdivided into many finer separations. The first salvaging operation is the separating of all alloy chips from the non-alloy. The alloy chips are then separated into 13 classes according to analysis and sold to users who can utilize the alloy contents. The non-alloy chips are separated into two divisions.

The extra heavy chips resulting from the heavy cuts taken in machining are kept separate from the lighter chips. The heavy chips are sent directly to the foundries where they are weighed up in the cupola charges and used as is. The lighter chips are taken to the stockpile for crushing and briquetting.

The lighter chips which were taken to the stockpile are run through a crusher, or chip breaker. This machine is made by the American Pulverizer Co., St. Louis, and has a capacity of from 10 to 15 tons an hour. In order to obtain a high density briquette, these steel chips are run through the breaker twice. The crusher setup is shown in Fig. 1. The cost of this operation is included in the total cost of briquetting steel chips, discussed later in this article, and is quite low due to the capacity of the machine.

The two briquetting presses, which are products of the Milwaukee Foundry Equipment Co., Milwaukee, are adjacent to the No. 1 foundry. They are located under a high track which allows the chips and borings to be delivered in bottom dump gondola cars to the hoppers that feed the presses. Each hopper holds about a car and a half of chips. Fig. No. 2 shows the setup of No. 1 briquetting machine with its discharge into a ring. In the foreground can be seen a pile of steel briquettes. The briquettes are handled from the ring by crane and are either loaded in cars for shipment to No. 2 foundry or East Side No. 1 foundry, or sent to the stockpile.

The inside of the briquetting press room with the dust collector setup is shown in Fig. 3. This collector is used only on cast iron borings which are dry and dusty. When it is in use, a screen having $\frac{3}{8}$-in. openings is used to catch the tramp iron and prevent it from entering the dies. The long conveyor seen under the hopper discharges the borings onto this screen placed over the hopper.

Careful sorting of material by the men who collect the borings is necessary to keep out all tramp iron and foreign material. The press operator must be alert to see that no tramp iron is allowed to enter the dies, as this decreases their life and causes breakage. This is particularly true when briquetting steel chips when the screen is removed.

The borings drop into the dies of the press and the ram forces these borings in the die against the anvil block with an hydraulic pressure of 1500 lb. per sq. in. On the release of the ram, the briquettes are discharged from the bottom of the die into a trough which feeds them onto a conveyor. This conveyor elevates the briquettes and discharges them into a ring, on the outside, as shown in Fig. 2. The pressure on the ram is developed by oil and each press has 300 gal. of medium heavy oil in circulation.

### Press Maintenance

The maintenance of the presses is very low, with the exception of the dies. Dies are of hardened steel

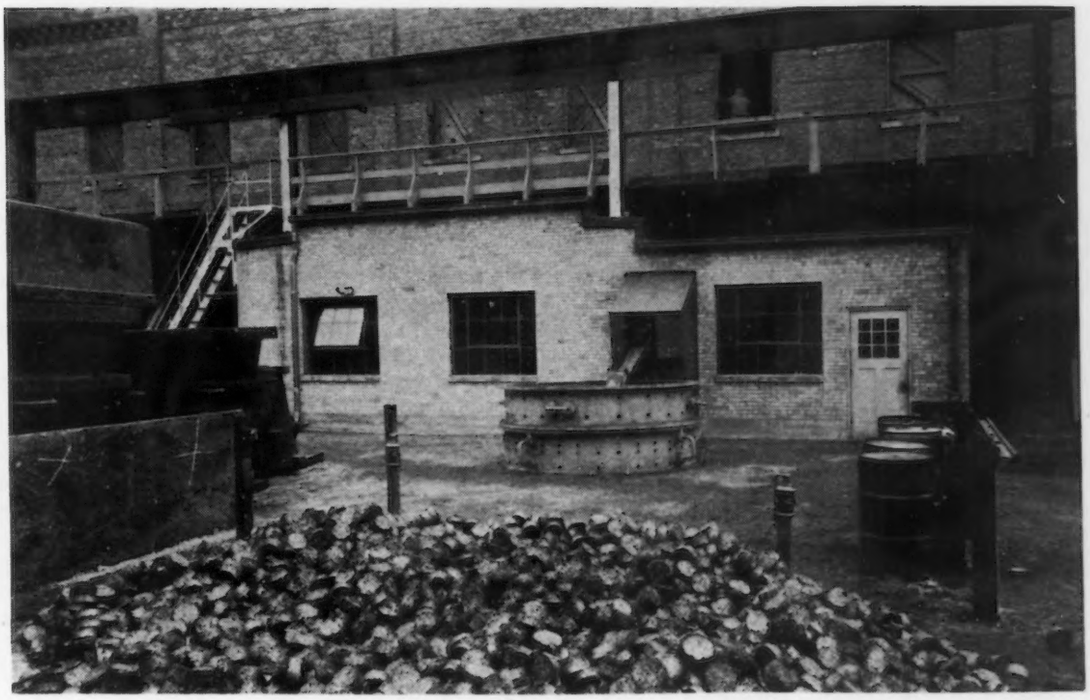


FIG. 2 — Briquettes from No. I briquetting machine discharge into the ring shown in this illustration. From here they can be handled by overhead crane. In the foreground is a stockpile of steel briquettes.

and are 4⅜ in. in diameter. They are used interchangeably on either cast iron borings or steel. The average life of the dies is around 330,000 briquettes and cost is around $400. These are forged and hardened in the company's forge shop.

When operating three shifts a day and six days a week, the dies are changed every two weeks and whenever possible they are reground and fitted with an oversize ram. It requires two men four hours each to change a set of dies. Very little trouble is ever encountered when briquetting cast iron and it is possible to obtain longer die life on this material, but as Allis-Chalmers briquettes a month's accumulation of these borings in nine days, it is obvious that the press must then take over on steel which is much harder on the dies due to the fact that steel chips are larger. Steel chips are also springy, curly, and ductile and as the ram comes in to press them, they tend to score, drag, and work in the sides between the die and the ram. This tends to slow up the stroke so that while the press will average 13 strokes per min. on cast iron borings, it will average only 12 on steel chips.

When briquetting cast iron borings the dust collector (Fig. 3) is quickly set up. It requires about one hour to connect. As the press averages 13 strokes a min. this means 13 cast iron briquettes. They are 4⅜ in. in diameter and 3½ to 4 in. long. They weigh 9 to 12 lb. and have a density of 85 per cent to 87 per cent of a solid piece of cast iron of the same size. Running three shifts a day, each press could turn out from 70 to 75 tons. The average operating time for three shifts is 22 hr. as 90 min. is allotted for cleaning the machines and delays will average 30 min. While it is true that the delays will not occur every day, this figure represents the average.

The cost of briquetting a ton of cast iron borings is approximately

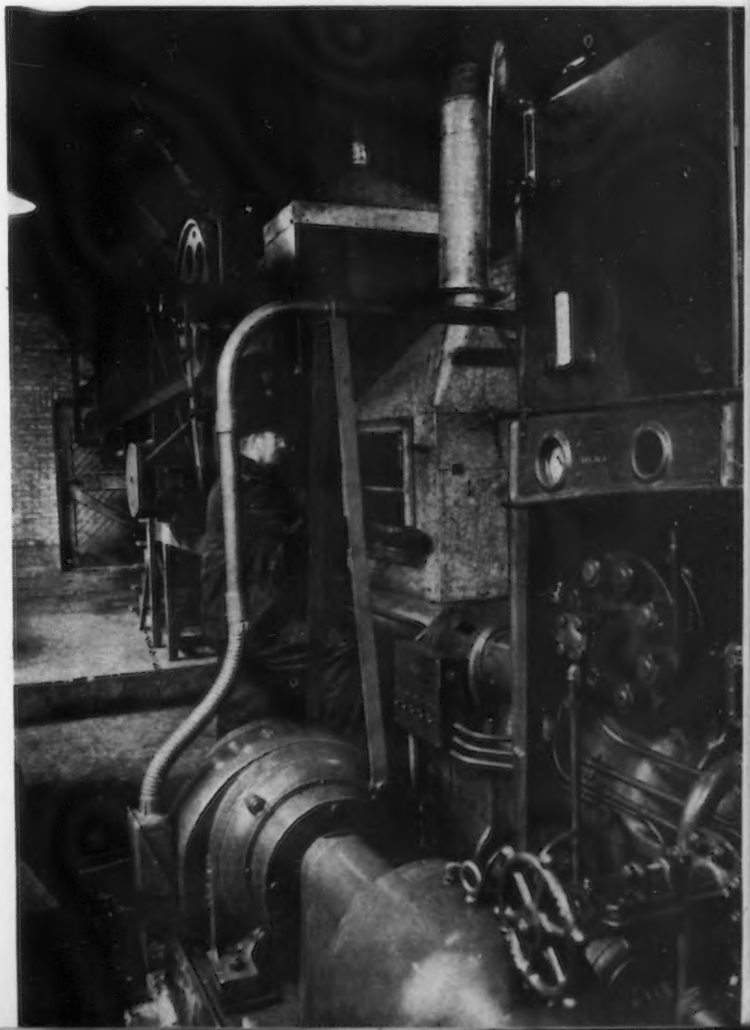


FIG. 3—A briquettes from showing the dust collector in position. This collector is used only with cast iron borings.

$1.90. This figure has been arrived at over the period these presses have been operating and include all applicable charges. The three main items in this cost figure are labor, depreciation and repairs.

It might be well to mention here that the cast iron briquettes will oxidize or rust in storage. While this is only skin deep, it would be well to consider having the briquettes pass through a slurry of cement, as is done by several manufacturers of briquetted material, if the briquettes are to be stored outside for any length of time.

As Allis-Chalmers uses up all its supply each month, it has never considered this necessary. Rusty or oxidized borings do not affect the operation of the press. Even what appear to be excessively oxidized borings make a briquette that is metallic and shiny.

When briquetting steel chips, the presses are run without the dust collector and the screen. The chips are fed directly into the press hopper and the operator must watch for tramp iron. As these chips are oily, they are dust free. The press squeezes out a very high percentage of this oil, but as it is a conglomeration of many different cutting oils, no attempt to salvage it is made at present. The small amount of oil retained by the briquette keeps it from rusting or oxidizing on storage and steel briquettes have been stored for a year without any sign of oxidation.

The press will average 12 steel briquettes per min. There are 4⅜ in. in diameter and 2 to 3 in. in length. They run 67 to 72 per cent in density when compared with a piece of solid steel. Their weight is 5 to 7 lb. each. Due to the smaller size of the briquette, a press will average from 38 to 40 tons a day when running three shifts. The average lost time is 150 min. a day since a longer time is alloted to cleaning up and the average time lost for repairs is 45 min. The average cost of briquetting steel chips is approximately $2.35 per ton, including the cost of crushing.

### Uses of Briquetted Materials

Allis-Chalmers has always tried to maintain an open mind concerning the amount of briquetted materials generally regarded as standard usage. To say that any certain percentage is a maximum is an admission of inability to cope with the problems of knowing what to do to obtain good metal. Any limitations on the use of briquettes should be due to the quantity available and the economic factors involved, since knowing how to handle the metal when it is tapped from the cupola overcomes the problems of the percentages contained in the mixture. This company uses as high as 85 per cent of the total charge and as low as 10 per cent.

### Briquette Charges

The cupola operators of the three foundries here much prefer to use briquettes over any other type of material due to the uniformity of the resulting iron. Since they are given the responsibility to see that all charges are weighed and charged correctly and any lack of uniformity in the analysis or chill tests is invariably blamed on poor supervision and lack of proper charging, it makes their tasks that much easier to use materials that insure this uniformity. That they prefer briquettes to other scrap is a recommendation in itself.

As Allis-Chalmers makes many types of iron it would be impossible in one paper to list them all, but to show the uses of briquettes we have detailed the main mixtures. There are around 600 tons of cast iron briquettes available each month and the charges are figured so that they are used up each month. At the present time, the total steel content of most mixtures is made up of steel briquettes, which amounts to approximately 800 tons per month.

There is one slight exception to this rule—that the first four or five charges on the bed contain no briquettes. This represents the charges that are put in on top of the bed before the blast is turned on and are allowed to soak. This is done only to eliminate a nuisance value, caused by the oil on the briquettes. This oil causes a dense white smoke for the few minutes before the flame reaches the charging floor or can be eliminated by using two good torches at the charging door.

As soon as the temperature at the charging door is high enough and the flame reaches it, the oil is consumed by combustion. Rather than create a nuisance, no chances are taken and so the briquettes are left off these few charges. This applies only to the steel briquettes and not to the cast iron.

*Ed. Note—The second and concluding article of this series will be published in next week's issue.*

FIG. 4—Borings being fed into the briquetting press hopper. The press operator must catch all tramp iron, etc., here. If this material gets into the press, considerable damage to the dies can result.

# Hardenability of Steel

By A. E. FOCKE
*Research Metallurgist,*
*Diamond Chain & Mfg. Co., Indianapolis*

***. . . The use of large alloy additions as a means of achieving deep hardening must be revised and greater attention given to controlling hardness depth by other means. Tests and procedures for doing this are summarized in this, the second of a series of three articles.***

IN the same way that it is known that plain carbon steels are water hardening, it has been long recognized that they are shallow hardening, and that alloy additions increase this depth of hardening. But for many purposes the cost of alloys is not justified, and now of course, alloys are not always available.

McQuaid and Ehn, as early as 1921, were really looking for a criterion for hardenability when they discovered the relationship between the normal and abnormal hypereutectoid structures and the tendency to develop soft spots on the surface of carburized parts. Out of this investigation developed the McQuaid-Ehn test for austenite grain size.

Soft spots are simply areas at which the cooling rate has been less than the critical and at which, therefore, the depth is zero. For certain types of tools it is essential that the depth of hardening be sufficient to prevent the development of soft spots and still not so great but that a soft core is left which prevents cracking on quenching or in service.

B. F. Shepherd, as long ago as 1926, as metallurgist for Ingersoll-Rand, was vitally concerned with the development of a control test which would assure a uniform depth of hardening. He early recognized, as did McQuaid and Ehn, that in plain carbon steels controlled chemistry alone was not sufficient to provide this assurance. For this purpose, Shepherd developed his P-F test, and the publishing of his paper on this subject in 1934[8] and his presentation of this material before many of the chapters during his term as president of the ASM in 1935 may be considered to have marked the start of popular interest in quantitative hardenability. Naturally, Shepherd did not work alone on this problem. It had been actively studied by all the tool steel producers and in that connection the work of Luerssen of the Carpenter Steel Co. is particularly noteworthy[9].

Actually, the P-F test has never won wide acceptance, that is, to an extent that tool steel suppliers would commonly list the P-F characteristics of their steels in their handbooks. Probably this is caused in part by the fact that relatively few users buy tool steels in sufficient quantities to justify detailed specifications and also to the natural desire of the tool steel suppliers to keep their customers purchasing by trade names.

Regardless of its failure to win wide acceptance, the P-F test is an important introduction to a discussion of quantitative hardenability because it takes into consideration all the factors which subsequent procedures have had to consider. The size of the specimen was kept constant at 1 in. round by 3 in. long, the cooling rate was established by specifying the handling of the test piece into water in a standard vertical jig, the materials normally used were all essentially eutectoid plain carbon tool steels so that the maximum hardness was constant and the effect of variations between lots of this same material, or in the same lot by varying the pretreatment or hardening temperature could be measured by noting the distance from the surface to which the test piece showed full hardness.

This was the P part of the test. The F part dealt with the grain size which was measured by comparing the appearance of the fractured surface with that of a set of standards which fortunately coincide very closely with the ASTM method.

This introduction by Shepherd lead to an ASM symposium on

hardenability at the annual meeting of 1938. In this symposium R. F. Mehl introduced the subject by an excellent discussion of the "Physics of Hardenability"[10] in which he showed how the effects of grain size, rate of nucleation, and rate of growth controlled hardenability and how by a physical chemical approach the effects of these factors may be separated and measured quantitatively. It is this work which Mehl and his associates have continued and which culminated in his brilliant Campbell Memorial Lecture last fall in which he showed for the first time that troostite was definitely finely lamellar pearlite, by means of the electron miscroscope at 30,000X.

Burns and Riegel[1] presented detailed information on the hardenability of plain carbon steels using a method of analysis which included all the elements of the P-F test but expanding it to cover ranges of carbon contents from the hypereutectoid to less than 0.10 per cent. With this range of carbon the maximum hardness was no longer constant so that Burns had previously[11] introduced a method of hardenability measurement in which the surface hardness (S), the average hardness (A) [area under the hardness penetration curve], and the center hardness (C), measured on the Rockwell C scale, were used.

Burns and Riegel were able to show that if the analysis of the steel (C, Mn, Cr, Ni, and Cu) were known for plain carbon steels, the A part of their SAC rating could be calculated from a series of empirical formulas. These formulas are as follows:

For C between 0.10-0.35, F = 2000 C + 500 Mn + 500 (Cr-0.05) + 100 Ni + 25 Cu

For C between 0.30-0.50, F = 1000 C + etc., etc.

For C between 0.50-1.00, F = 500 C + etc., etc.

and the relationship between these F (factor) values and the A (Rockwell) values is shown in Fig. 6.

In this same symposium Queneau and Mayo[12] presented a paper on "Hardenability and its Designation" in which they expanded a discussion which they had presented on the original Burns, Moore, and Archer paper[11] in which they showed that $\frac{h}{r} : \frac{1}{D^2}$ where h is the depth of hardened case, r is the radius of the round, and D is the diameter. The straight line which results from plotting values of $\frac{h}{r}$ in terms of $\frac{1}{D^2}$ they designated as the "hardenability line." Fig. 7 shows a series of hardenability lines for steels with various F values calculated from the Burns formulas. The value of the ordinate is $\frac{h}{D}$ and a value of 0.5 must therefore represent full hardening across the section and is usually designated the "critical" size. On the abscissa are plotted the values of $1/D^2$ and, for convenience, the values of D corresponding to these ratios are shown also. The work of Scott[13] really set up the basic principles used in this analysis.

It is necessary to call attention to what is meant by depth of hardening as used in these relations, and this can probably be done best by referring to the paper by Grossmann on "Relation of Hardenability to Quenching"[7].

It can be shown that if a round bar of steel of sufficient hardenability and length at least five times its diameter is quenched from the austenitic state, the outer sections will be martensitic; and if the bar diameter is great enough, the rate of cooling from the surface in toward the center will decrease until it is less than the critical rate and some troostite will form. This troostite increases in amount rapidly with only slight decreases in cooling rate until most of the martensite disappears. If the bar is cut carefully at midlength and etched in 1 to 1 HCl. the outer martensitic zones will etch less darkly. The diameter of

**FIG. 6—Empirical formulas worked out by Burns and Riegel are used in developing the factor abscissa of this chart of low, medium, and high carbon steels.**

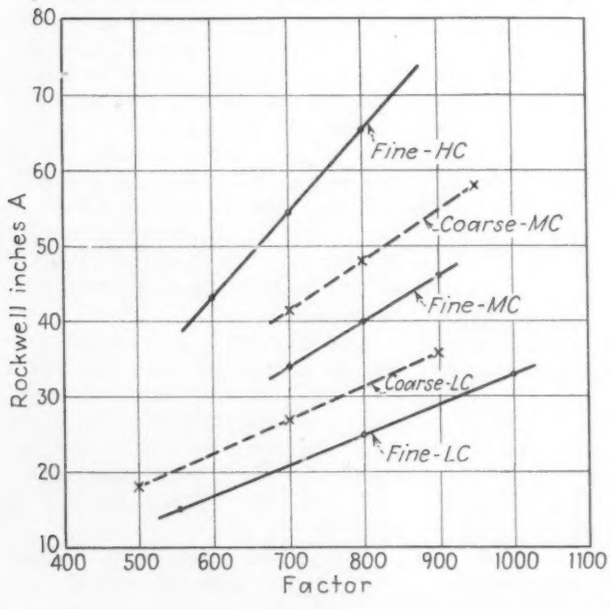
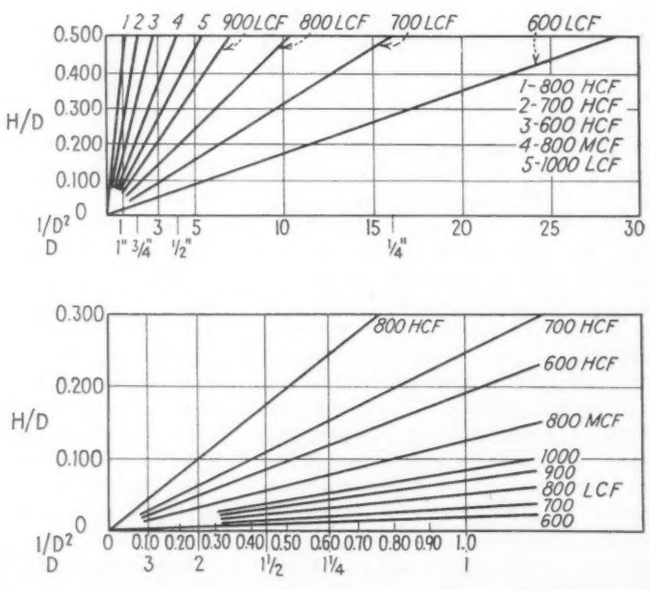
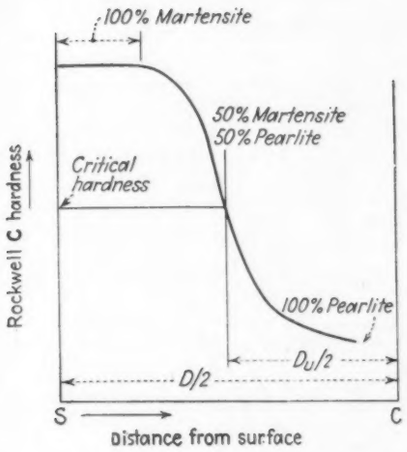



**FIG. 7—A series of hardenability lines for various steels, with various F values calculated from the Burns formula.**





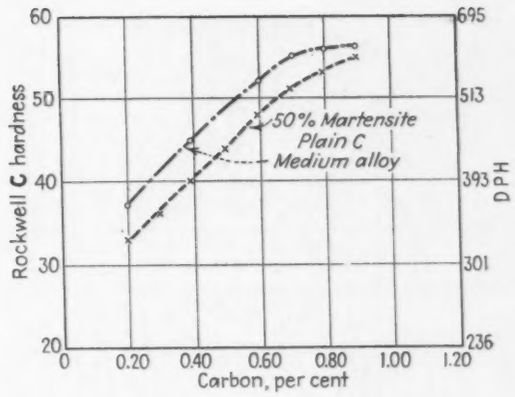

LEFT

**FIG. 8—Rockwell readings taken across two diameters and plotted against their distance from the surface of a hardened steel bar.**

° ° °

RIGHT

**FIG. 9—Relation between critical hardness and carbon content (after Grossmann).**




the unhardened core can be measured, or more accurately, the area of this core can be estimated by counting squares using transparent cross section paper and the diameter calculated from this area. Or a Rockwell hardness traverse can be made across the piece on two diameters. A plot of these Rockwell readings versus distance from the surface would result in a curve of the type shown in Fig. 8. If the microstructure associated with these hardnesses were studied, it would be found that as the hardness drops off the amount of troostite increases and at some point there are approximately equal parts of both. The hardness associated with this 50 per cent martensite-50 per cent troostite structure is called the "critical hardness." The choice of this point is somewhat arbitrary but is justified by the fact that it corresponds to that point at which the slope of the hardness-depth curve is a maximum. That is, this slope is so great that wide differences in amounts of martensite or troostite will not greatly change the distance from this point to the center; which distance, at the critical hardness, is one-half of the diameter of the unhardened zone, Du. Another reason for choosing this point is that it corresponds very closely with the junction between the two types of surfaces developed on etching.

That this critical hardness is difficult to establish accurately is the weakest part of the method, although practically and particularly, if the results are checked by both Rockwell traverses and etched areas the accuracy will be good enough.

The lower dashed line of Fig. 9 shows the relationship between critical hardness and carbon content for plain carbon steel. The effect of alloys is to raise this value somewhat within the range indicated to a maximum shown by the upper dashed line.

Fig. 10 shows diagrammatically the effect of varying the diameter of rounds of the same material quenched from the same temperature into oil and water respectively. The cross-hatched areas indicated the unhardened zones. It might be profitable to recall here that Grossmann therefore has simply modified the Shepherd method to include variations in diameter and in quenching media but keeping the other factors constant. It is possible to show the same data on the basis of the results of hardness traverses, by diagrams of the type of Fig. 11 for the oil quench and Fig. 12 for water. Actually, these curves should all be symmetrical about the center line, but it has become customary to show the complete section and such diagrams have been recorded in various steel companies' handbooks. Because of their character and shape they are commonly designated as "U" curves.

Grossmann's main contribution lies in his use of the diameters of the unhardened cores to measure the severity of the quench.

Using either the diameters of the unhardened cores Du, obtained from the cross-hatched zones of Fig. 10, or from the hardness traverses by recording the diameter less than the critical hardness for each of the sizes quenched, a series of values, such as shown in Table II, would be developed.

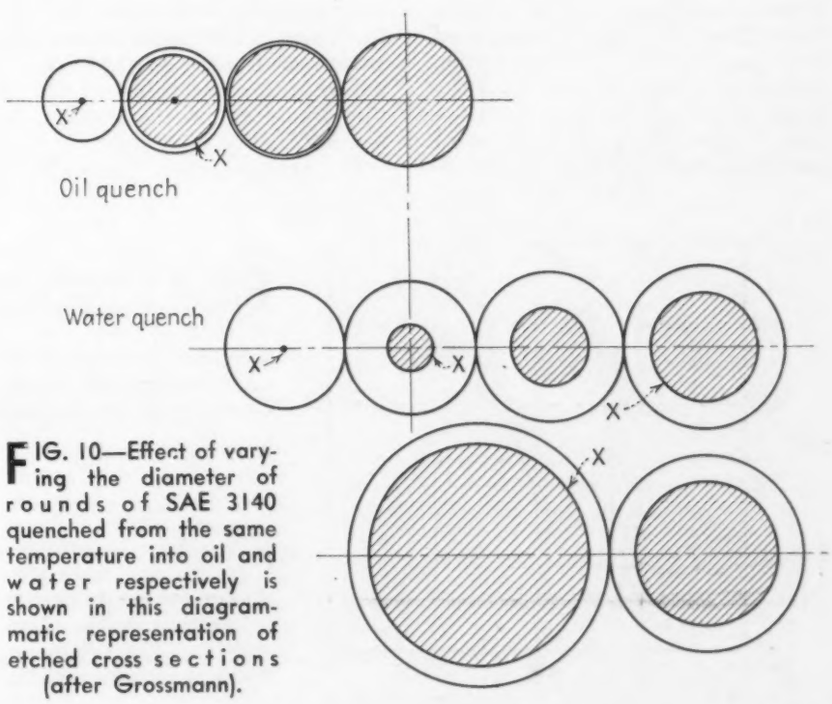



**FIG. 10—Effect of varying the diameter of rounds of SAE 3140 quenched from the same temperature into oil and water respectively is shown in this diagrammatic representation of etched cross sections (after Grossmann).**

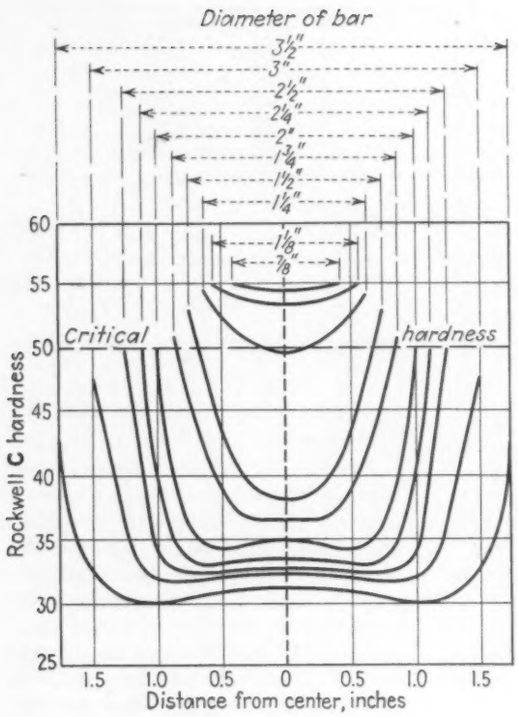



FIG. 11—Hardness distribution curves for SAE 3140 steel quenched in oil, another way of showing the phenomenon illustrated in Fig. 9 (after Grossmann).

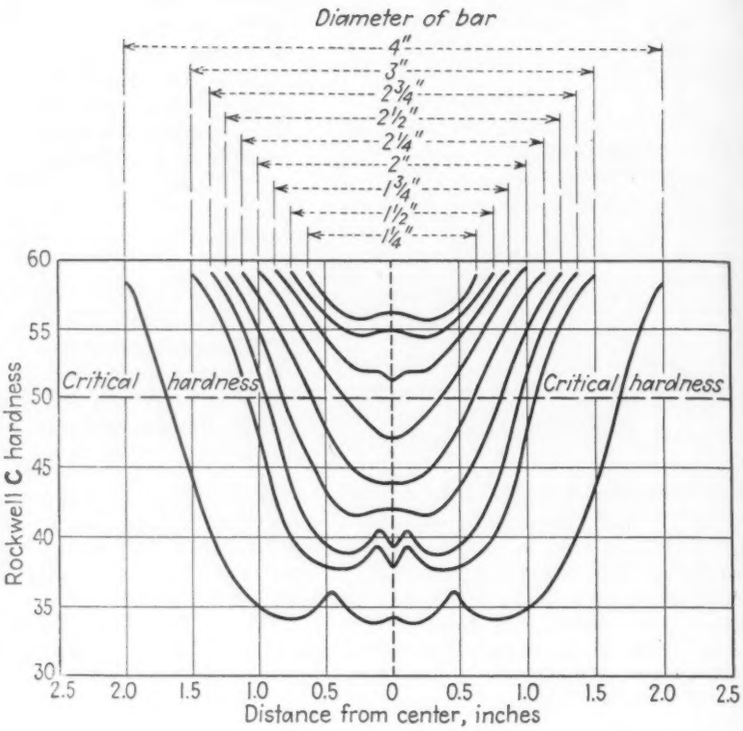



FIG. 12—Same as Fig. 11 but for SAE 3140 steel quenched in water.

The Du/D versus D values of Table II may then be plotted as shown in Fig. 13 from which it is clear that the shape of the curve is controlled by the drasticity of the quench. Grossmann and his associates showed by some complicated mathematics — based on Newton's law of cooling (which states that the rate of heat flow is in proportion to the temperature difference), and the fact that the thermal diffusivity is constant— that if these values of Du/D were plotted against D using a logarithmic scale for D, as shown in Fig. 14, then the drasticity of the quench could be determined by moving this Fig. 14 over the chart shown in Fig. 15 until the curves match. For illustration, in this article, this procedure was followed but the results plotted on their corresponding lines of Fig. 15. Each line corresponds to constant values of H x D, so that with D known for each value of Du/D, the drasticity of the quench, H, can be readily obtained.

For example, from Table III for 3140 quenched in oil, when D is 1¼ in. Du/D equals 0.24, and at this point the matching curve of Fig. 15 cuts the vertical at H x D equals 0.62 and therefore H will equal 0.5.

Similarly, for the water quenched, when D is 2 in., Du/D is 0.35; and at this point on the matching curve H x D equals 6, so that H equals 6/D or 3. If the curves of Figures 14 and 15 are properly matched, the H values will be 0.5 and 3 for the oil and water quench respectively for any value of D and corresponding Du/D.

By these methods it was originally shown that the common

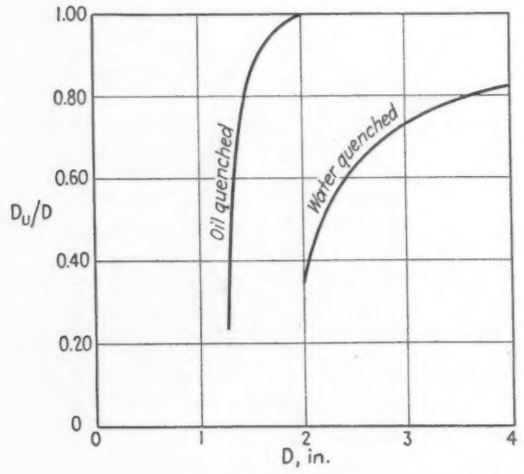



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FIG. 13 — Plotting the Du/D versus D values of Table II shows graphically that the shape of the curve is controlled by the drasticity of the quench.

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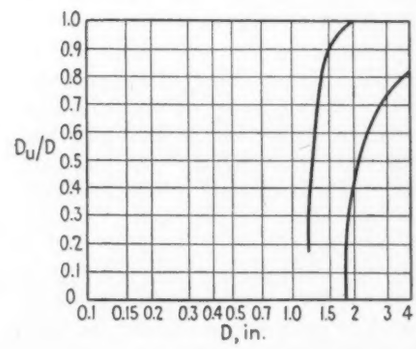
RIGHT

FIG. 14 — Logarithmic values have been substituted for the arithmetic values of D in Fig. 13 so that this curve will be on the same scale as Fig. 15.



methods of quenching have H values as follows:

| Method of Cooling | H Value |
|---|---|
| Still air | 0.02 |
| Moderate motion in oil | 0.4-0.5 |
| No motion in water | 1.0 |
| High velocity oil | 1.5 |
| Moderate motion in water | 4.0-6.0 |
| High velocity water | 10 or more |

Later tests indicate that these H values are too high, particularly for the more violent quenches. The figures[14] in Table IV are probably more nearly correct.

As defined above in discussing the hardenability lines of Fig. 7, the critical size $D_c$ is that diameter at which the unhardened core (that section with hardness less than the critical) just disappeared, and for the 3140 steel used as an example the diameter of the critical size becomes

Dc = 1.2 in. for oil quench (H = 0.5)

Dc = 1.8 in. for water quench (H = 0.5)

The next problem was to obtain a measure of hardenability independent of the quench. To do this, Grossman developed the concept of the ideal critical size as that diameter at which the unhardened core would just disappear if the piece were quenched in a mythical manner so that the H would be infinite.

At first glance, it would appear that if the quench rate were infinite, any size piece would harden completely; but again, it must be recalled that all such a quench would accomplish would be to cool the surface instantly but the rate at any point below the surface would still depend upon the heat conductivity (thermal diffusivity) of the steel, which is a finite value. By the same mathematical and basic assumption used previously, Grossmann developed the charts shown as Figs. 16 and 17.

Knowing the critical size Dc and the H values which produced it, the ideal critical size can be determined by following across horizontally in Fig. 16 from this value of Dc to the curve representing the value of H at which this Dc was obtained and then dropping vertically to the base line and reading off the value of the ideal critical size $D_1$.

Theoretically, if the samples of 3140 used for the two quenches illustrated had been identical, the $D_1$ calculated for both the oil and the water quench should be the same. Actually, as shown in Fig. 16 the $D_1$ from the oil quench data is 2.45, while from the water it is only 2.2. This difference becomes relatively insignificant when it is compared with the range of ideal critical size for various SAE analyses in Table V.

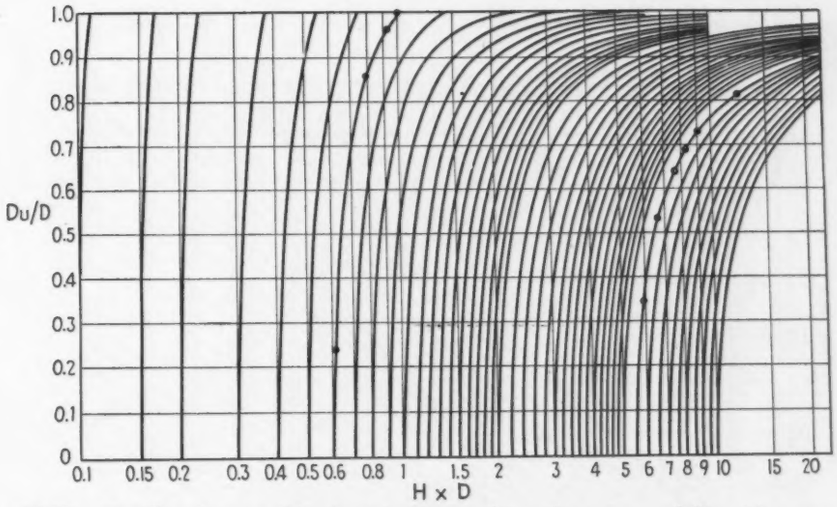
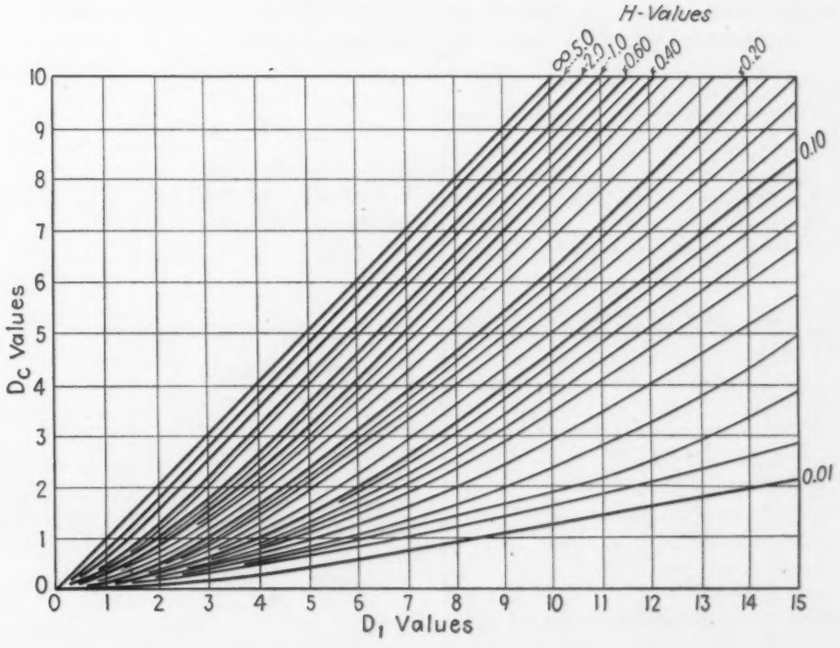



FIG. 15—The dots on this chart indicate where the curves of Fig. 14 were superimposed so as to obtain a quantitative measure of the drasticity of the quench (H) (chart after Asimow).

The results of Table V are recorded graphically in Fig. 18 in terms of total alloy. The effect of small additions of molybdenum, particularly when added with other alloys, is strikingly illustrated in the differences between 9140 (No. 7) and X9140 (No. 11): 3240 (No. 10) and 4340 (No. 13); 5140 (No. 4) and 4140 (No. 9).

In his latest paper "Hardenability Calculated from Chemical Composition" presented in February, 1942, before the AIME, Grossmann[14] shows that it is possible to calculate the hardenability of steels in terms of $D_1$ with 10 to 15 per cent accuracy if the "complete" analysis, including incidentals (residuals) such as chromium and nickel and the grain size are known. In other words, he has simply extended the work of Burns and Riegel referred to above, but by using his concept of

FIG. 16—Relationship between ideal critical size $D_1$, critical size $D_c$, and severity of quench H. Open scale for steels with low hardenability (Grossmann, Asimow and Urban).



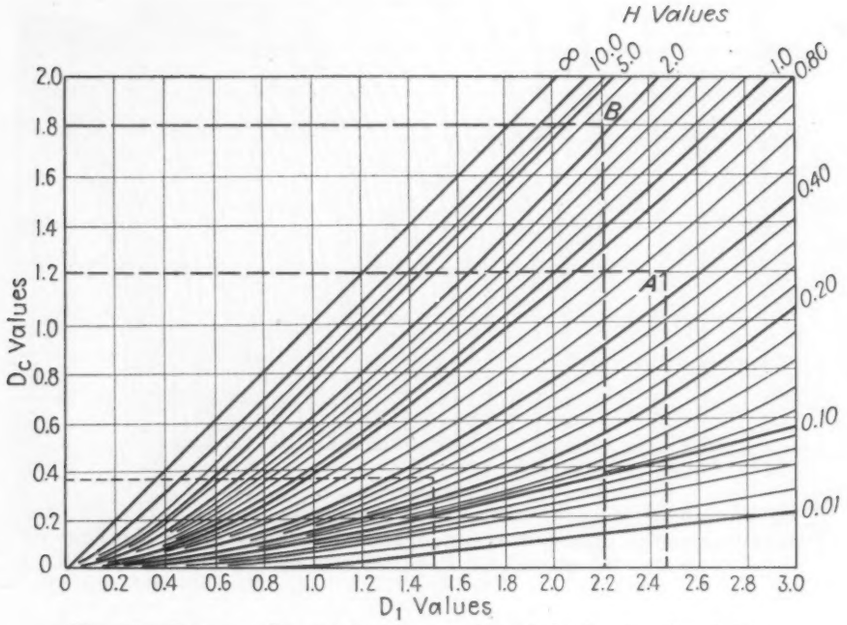



Fig. 17—Same as Fig. 16 but for steels with higher hardenability.

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"ideal critical diameter" he was able to determine various multiplication factors for each of the common chemical elements and for grain size. In his paper, his results are shown as a series of charts from which the hardenability can be calculated.

From his studies, isolating the effect of each element he arrived at several interesting conclusions, for example: (1) That the first small addition of an element has a much more powerful percentage effect than greater additions, so that if two elements have equal effect, a greater hardenability will result from using equal parts of both rather than one only, (2) that manganese is actually as powerful a hardening agent as molybdenum, and (3) that even in medium carbon steels with carbide forming elements such as chromium, with or without molybdenum or vanadium, sufficient undissolved carbides may remain after common heat treating to result in an effective loss of 35 to 50 per cent of the hardenability.

Perhaps the most useful contribution Grossmann has made by his concept of the $D_I$ is that it shows that simply increasing the drasticity of the quench will not provide complete hardening if the section exceeds certain well-defined limits.

In his paper "Hardening Characteristics of Various Shapes"[18] Grossmann demonstrated how these concepts could be applied to shapes other than rounds. Using the same fundamental assumptions as before, he developed the charts shown as Figs. 19, 20 and 21. From these the data obtained for rounds may be calculated into flats in this manner:

1. Measure Du/D for enough samples to establish H and then Dc.

2. From 1 calculate $D_I$ using Fig. 16 or 17.

3. The ideal plate thickness ($L_I$) is $D_I/1.377$ in.

4. From Fig. 19 or 20 determine the critical thickness $L_c$ for the H values desired.

5. From Fig. 21 determine the thickness of the unhardened core $L_c$ for this value of $L_c$ and H and plate thickness actually used.

Obviously, if plate data were known and those for rounds desired, the operation would be reversed.

For illustration of this:

Using the 3140 steel as before for which the $D_I$ was 2.3 as quenched in water (H = 3) the ratio of the unhardened core to a full plate thickness of 2 in. would be: (Since steps 1 and 2 are known)

Step 3. $L_I = 2.3/1.377 = 1.67$

Step 4. From Fig. 19 at $L_I$ 1.67 H = 3.0 $L_c = 1.4$

Step 5. From Fig. 21 $L_c$ x H = 4.2 set off on base, follow curve intersection with vertical representing actual plate 2 x 3.0 = 6.0

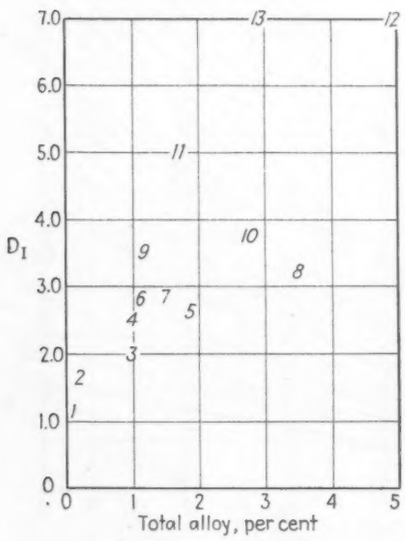


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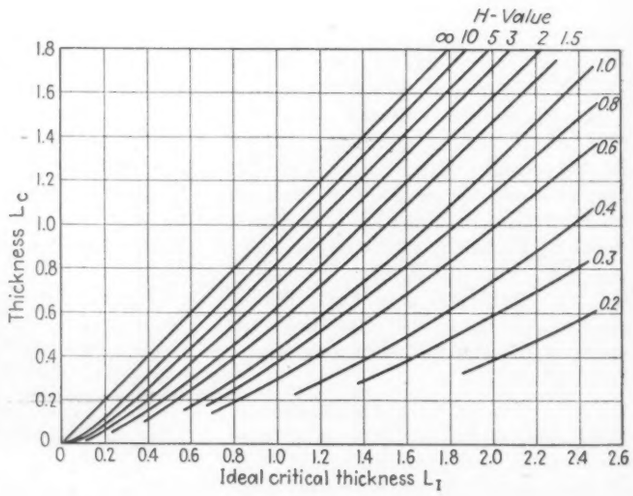
FIG. 18—Graphic illustration of the results of Table V.

° ° °

RIGHT

FIG. 19—Relationship between ideal critical thickness $L_I$, critical thickness $L_c$ and severity of quench H. Open scale for steels with low hardenability. (Grossmann, et al.).



$L_u/L = 0.65$ (Ref. X on Fig. 21)
$L_u/2 = 0.65$
$L_u = 1.3$ in., thickness of unhardened core.

From a practical standpoint, any method of quenching various rounds is laborious and difficult, particularly as the hardenability increases when the number of pieces to be prepared, quenched, sectioned and traversed becomes large and, because in many cases, rounds of sufficient diameters are not readily available.

Part of these objections were eliminated by Greene and Post[16] for shallow hardening steels by using a conical specimen as shown in Fig. 22. They showed that for any quenching medium, the critical size for the steels tested was equal to the diameter of the cone at that point at which the critical hardness occurred along the cone axis, provided that the hardenability of the material was such that for this quench this point occurred not more than 3½ ins. from the ¼-in. tip.

The writer has found that by using these cones made from a lot of SAE 1045 for which the ideal critical size ($D_1$) had been determined by other methods, the H value of his laboratory and production oil and water quenches could be measured and compared quantitatively. For example, assuming that the $D_1$ value for this sample of 1045 was 1.50 and that when a Greene and Post cone of this material was quenched in the laboratory oil bath and sectioned, the critical hardness of Rockwell C 42 was found at ⅝ in. from the tip; then from geometry or by direct measurement, the diameter of the cone at that point $D_c$ would be ⅜ in., and from the intersections of the dotted lines of Fig. 16 this would show that the H value of the laboratory oil quench was about 0.3. This method has also proved very useful in determining the value of various special quenching oils or compounds.

Also it was really to eliminate many of the difficulties encountered in quenching various sized rounds that Jominy developed the end quench method[6]. In this method, a sample such as shown in Fig. 23 is quenched by a spray of water on one end only. Since its introduction by Jominy at the ASM Hardenability Symposium in 1938, it has been subjected to various modifications and critical tests[16,17] which only last January, 1942, resulted in its acceptance by the SAE as its proposed standard procedure for hardenability testing[18]. This standard procedure requires that the piece be normalized before quenching, but permits modifications if mutually agreed upon. The writer feels that while it is desirable to normalize first when comparing steels for general information, for practical applications the pretreatment should be no more or less than that which the part will receive

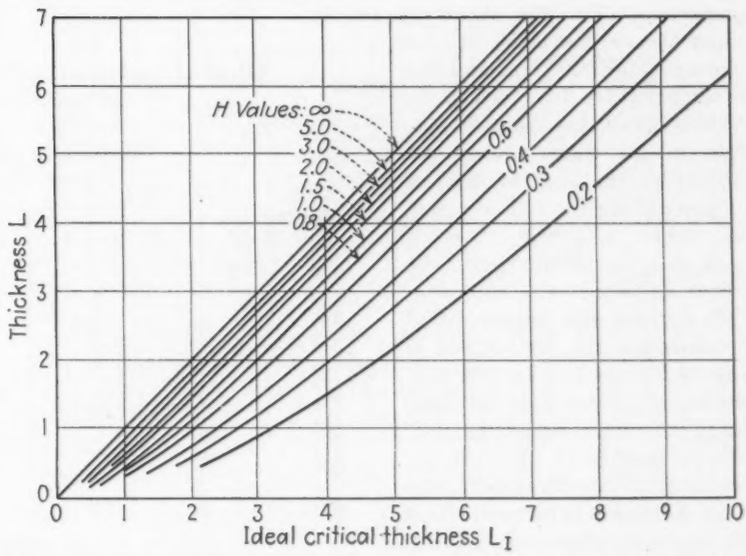



FIG. 20—Same as Fig. 19 but for steels with higher hardenability. (Grossmann, et al.).

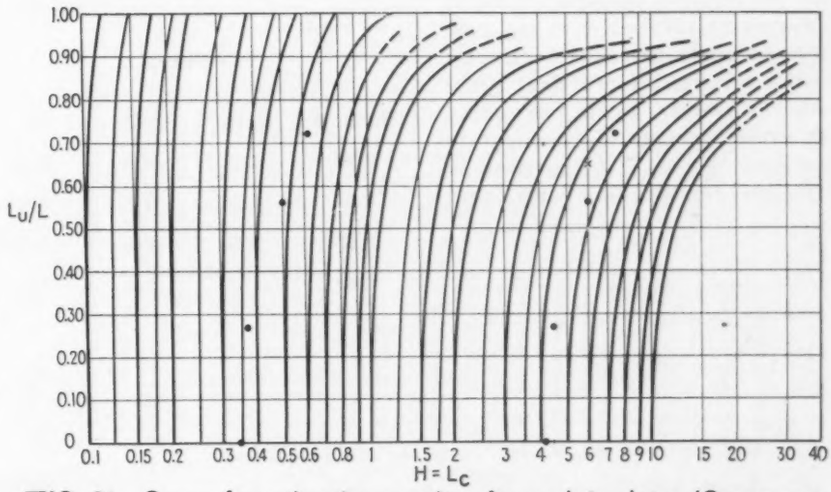



FIG. 21—Curves for estimating severity of quench in plates. (Grossmann, et al.). With Figs. 19, 20, and 21, hardenability data obtained from rounds may be transposed into equivalent figures for flats or vice versa.

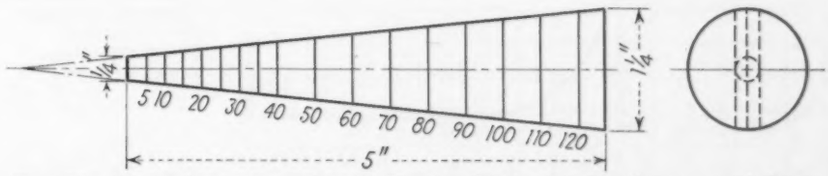



Fig. 22—Conical specimen for shallow hardening steels. Greene and Post.

in production. For the standard specimen the orifice is ½ in., the free water height 2½ in. and the water temperature 75 ± 5 deg. F. With these fixed, the quench rate is fixed on the water-cooled end and therefore the rate of cooling at all points along the bar is established. When a Jominy test is watched for the first time, the slow rate at which the temperature back from the water-cooled end drops below the visible red is striking. After cooling in this way for ten minutes, two flats 180 deg. apart and 0.015 in. deep are ground the entire length of the sample and Rockwell C hardness readings taken at 1/16 in. intervals. The results are then plotted as shown in Fig. 24.

The shape and position of these Rockwell hardness-end distance curves alone are sufficient to establish the relative hardenabilities of different steels, but it is not possible to apply these data directly to the solution of practical problems. However, again, by using the same concepts of cooling rate described above, it is possible to correlate Jominy data with ideal critical size and thus obtain practical usefulness.

*Editor's note: This is the second of a series of three articles. The conclusion, next week, correlates the test data, giving a practical application of the substitution of SAE 1045 for SAE 3140 steel in a gear blank.*

TABLE II
Effect of Variations in Diameter and in Quenching Media on Critical Hardness of SAE 3140 Steel

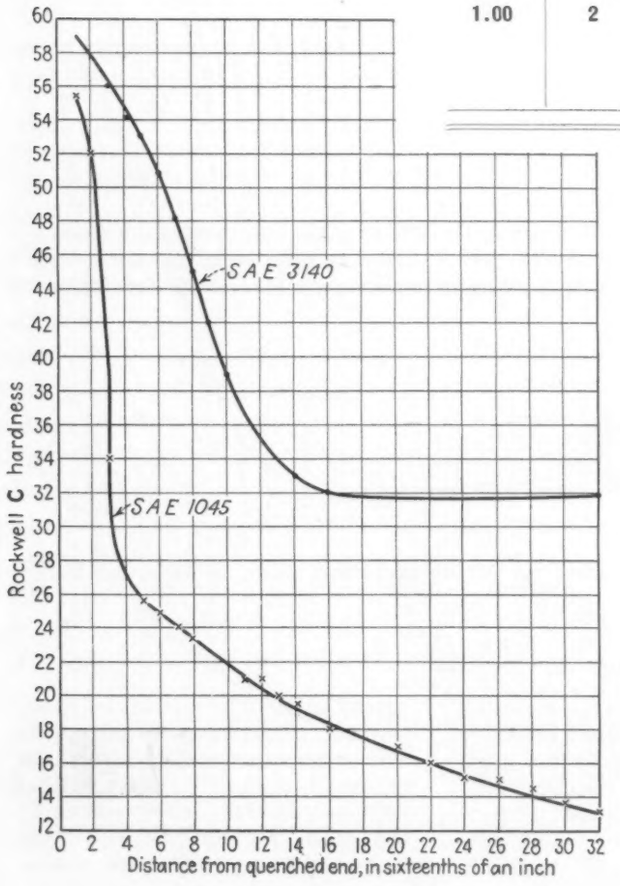
| Diameter of Bar, (D) In. | Diameter of Unhardened Cores, (Du) In. | | Du, D In. | |
|---|---|---|---|---|
| | Oil Quench | Water Quench | Oil Quench | Water Quench |
| 7/8 | 0 | 0 | 0 | 0 |
| 1 1/8 | 0 | 0 | 0 | 0 |
| 1 1/4 | 0.3 | 0 | 0.24 | 0 |
| 1 1/2 | 1.3 | 0 | 0.86 | 0 |
| 1 3/4 | 1.7 | 0 | 0.97 | 0 |
| 2 | 2.0 | 0.7 | 1.00 | 0.35 |
| 2 1/4 | ... | 1.2 | .... | 0.53 |
| 2 1/2 | ... | 1.6 | .... | 0.64 |
| 2 3/4 | ... | 1.9 | .... | 0.69 |
| 3 | ... | 2.2 | .... | 0.73 |
| 3 1/2 | ... | ... | .... | .... |
| 4 | ... | 3.3 | .... | 0.82 |

TABLE III
Calculation of H Values by Superimposing the Curve of Fig. 14 on That Shown in Fig. 15, SAE 3140 Steel

| Oil Quench | | | | Water Quench | | | |
|---|---|---|---|---|---|---|---|
| Du/D, In. | D, In. | HD | H | Du/D, In. | D, In. | HD | H |
| 0.24 | 1 1/4 | 6.2 | 0.5 | 0.35 | 2 | 6 | 3 |
| 0.86 | 1 1/2 | 7.5 | 0.5 | 0.53 | 2 1/4 | 7 | 3 |
| 0.97 | 1 3/4 | 8.8 | 0.5 | 0.64 | 2 1/2 | 7.5 | 3 |
| 1.00 | 2 | 1.0 | 0.5 | 0.69 | 2 3/4 | 8.4 | 3 |
| | | | | 0.73 | 3 | 9.0 | 3 |
| | | | | 0.82 | 4 | 12.0 | 3 |

TABLE IV
Revised Table of H Values for Various Quenches

| Method of Cooling | Oil | Water | Brine |
|---|---|---|---|
| No circulation of liquid or agitation of piece | 0.25–0.30 | 0.9–1.0 | 2 |
| Mild circulation or agitation | 0.30–0.35 | 1.0–1.1 | 2–2.2 |
| Moderate circulation | 0.35–0.40 | 1.2–1.3 | |
| Good circulation | 0.40–0.50 | 1.4–1.5 | |
| Strong circulation | 0.50–0.80 | 1.6–2.0 | |
| Violent circulation | 0.80–1.10 | 4 | 5 |




LEFT
FIG. 24 — Results of Jominy and quench tests on SAE 1045 and SAE 3140 steels.

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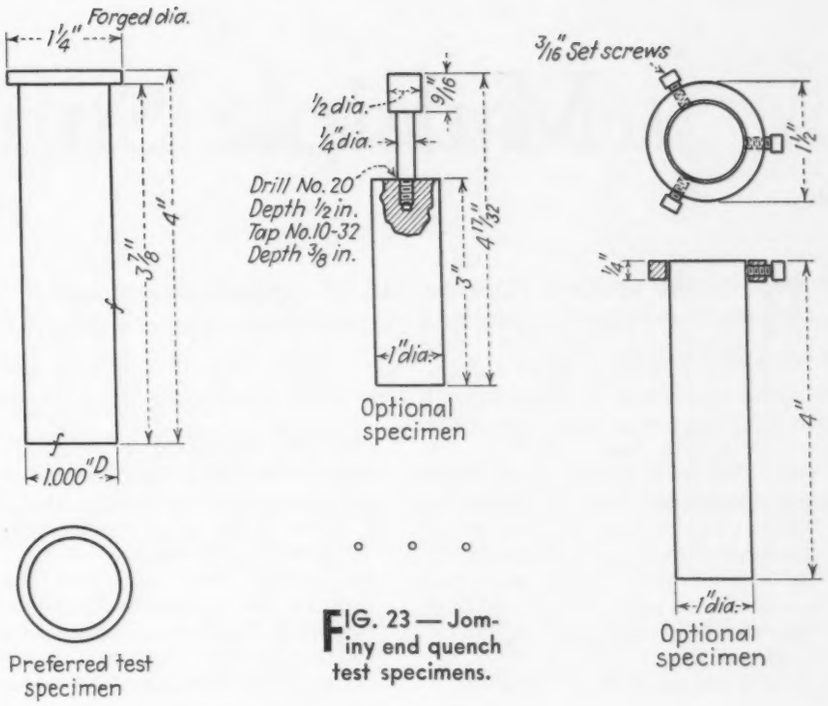


FIG. 23 — Jominy end quench test specimens.

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TABLE V

Representative Hardenabilities of 0.40 Per Cent Carbon Steels

| No. in Fig. 1B | Steel Description | Significant Elements | Total Average Alloy | $D_1$ |
|---|---|---|---|---|
| 1 | 1040 | 0.60–0.90[6] Mn | None | 1.1[6] (0.9–1.3) |
| 2 | 40 C Amola (A4037) | 0.15–0.25 Mo | 0.2 | 1.6 (1.3–1.9) |
| 3 | T1340 | 1.60–1.90 Mn | 1.0 | 2.0 (1.7–2.3) |
| 4 | 5140 | 0.80–1.10 Cr | 1.0 | 2.5 (2.2–2.9) |
| 5 | 3140 | 1.00–1.50 Ni<br>0.45–0.75 Cr | 1.9 | 2.6 (2.3–3.0) |
| 6 | 6140 | 0.80–1.10 Cr<br>0.15 Va | 1.1 | 2.8 (2.4–3.1) |
| 7 | 9140 | 0.70–0.90 Si<br>0.50–0.65 Cr<br>0.10–0.20 Zr | 1.5 | 2.9 |
| 8 | 2340 | 3.25–3.75 Ni | 3.5 | 3.2 (2.8–3.6) |
| 9 | 4140 | 0.80–1.10 Cr<br>0.15–0.25 Mo | 1.2 | 3.5 (3.0–4.0) |
| 10 | 3240 | 0.90–1.25 Cr<br>1.50–2.00 Ni | 2.8 | 3.8 (3.4–4.2) |
| 11 | X9140 | 0.70–0.90 Si<br>0.50–0.65 Cr<br>0.10–0.20 Zr<br>0.10–0.20 Mo | 1.7 | 5.0 |
| 12 | 3340 | 3.25–3.75 Ni<br>1.25–1.75 Cr | 5.0 | 7.0 (7.0–9.0) |
| 13 | 4340 | 1.65–2.00 Ni<br>0.70–0.90 Cr<br>0.20–0.30 Mo | 2.9 | 7.0 |

# Multiple Subpress Dies

By GEORGE F. WALES
*President, Strippit Corp., Buffalo*

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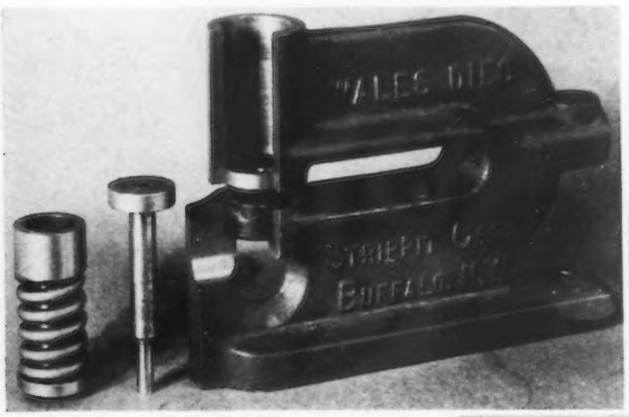
BECAUSE of the fact that aircraft designs have not been frozen and frequent modifications therefore have to be made in tooling to accommodate changes in design, the use of interchangeable subpress type hole punching dies has become almost universal throughout the aircraft industry. These dies are being used in multiple to perform a series of in-line or out-of-line rivet hole punching operations on press brakes and both hole punching and notching operations are being performed on irregular shapes in punch presses.



ABOVE

FIG. 1—This type of perforating die is for use on templates in a press or mounted on adapters in a press brake. This disassembled and cut-away view shows the simplicity of construction of these units. Punches, guides and springs may be removed from the holders instantly. Lower die has a light press fit in the cast iron holder. Guide button is a slip fit in the upper arm.

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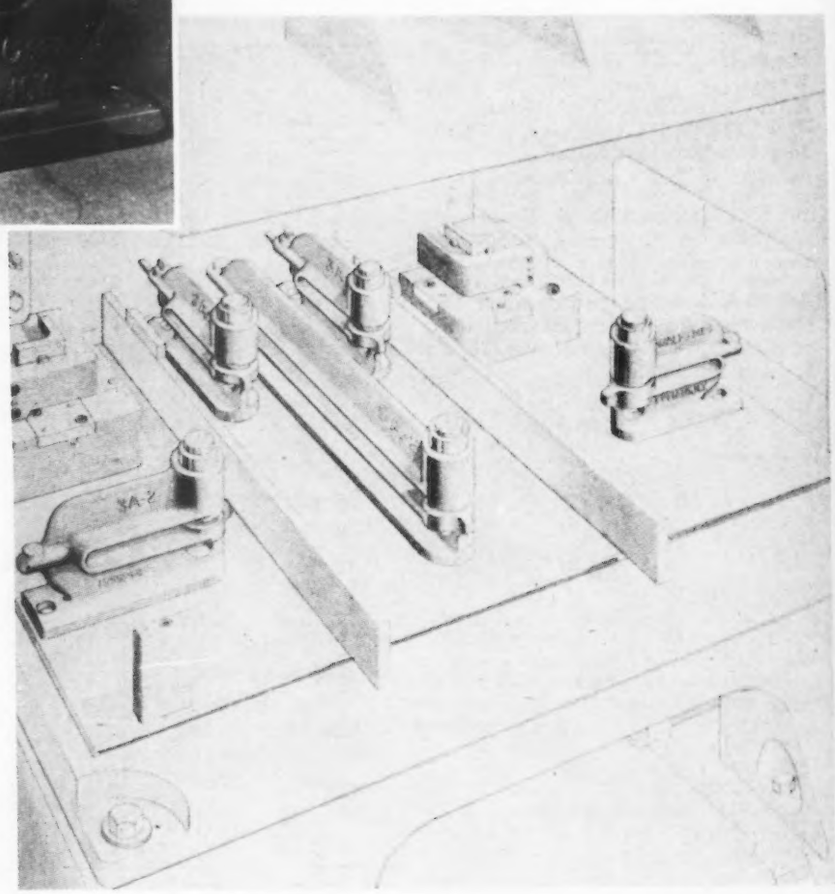
These Wales dies were invented in 1932 and found ready acceptance in the aircraft industry long before war was ever thought of. The principle of all these dies, which is covered by patents as to construction and method of using, is that they are self-contained units having the punching elements carried in individual holders which also carry the die elements. It is unnecessary, therefore, for any part of the punching equipment to be attached to the reciprocating ram of the machine on which they are used, be it press brake or stamping press. The ram merely strikes the top of the punches and depresses them through the material. On the upstroke, the floating stripping guide, which descends with the punch, strips the punch from the work.

Fig. 1 shows a cutaway view of a type of Wales subpress die designed for use in a punch press.

In general, Wales dies may be set up in three ways: On templates, on T-slotted plates and on the rails of press brakes. Where runs are large or repeated frequently, punching and notching dies may be mounted on steel templates 3/16 in. thick, Fig. 2. At the desired points where the holes are to be punched, 3/8 in. holes are drilled to accommodate pilot pins on the bottom of the holders. The holders are fastened by countersunk screws, 3/8-16.

BELOW

FIG. 2—This sketch shows a group of hole punching and corner notching dies mounted on the same template. The two long rails extend several inches ahead of the dies and form a ledge on which the sheet is placed before being fed into the dies.



# For Aircraft Fabrication

***. . . Frequency of design changes in aircraft sheet metal parts makes it highly desirable to use low cost die sets for punching rivet holes. The interchangeable subpress type hole punching dies are widely used in the industry because the arrangement of the dies can be changed to suit various rivet pitches in a matter of minutes. They are also suitable for notching operations on bulkheads and the like.***

Rails which support and guide the work into the throat of the holders are also fastened to the template with countersunk screws from the bottom side. Usually, the rest bars and gages are left in place and stored with the template in suitable racks, Fig. 3, while the units are unscrewed so as to be available for current work. The accuracy of these dies depends upon the accuracy with which the templates are made. but once the templates are drilled, the production of duplicate parts is assured.

The same dies may be used without mounting on a template by attaching them to a T-slotted plate, which is clamped to the press platen. Location of the dies is achieved by means of pilot plugs inserted in place of the punching units that engage in holes in one of the pilot blanks or a thin template of the part to be perforated.

Fig. 4 shows a series of airframe bulkhead notching dies being located on a T-slotted plate by means of a template. Since the notching punches are of uniform cross-section throughout their length the template may be laid against the tops of the dies where the punches protrude against the stripping spring pressure. Note the use of guide rails for supporting the stock at the die level.

Assemblages of large numbers of these dies can be made up and slid onto the bed of a press, ready to operate without any further adjustment or tryout. Fig. 5 shows a set-up of a hole punching dies mounted on a T-slotted plate to perform operations on three different blanks at each stroke of the press.

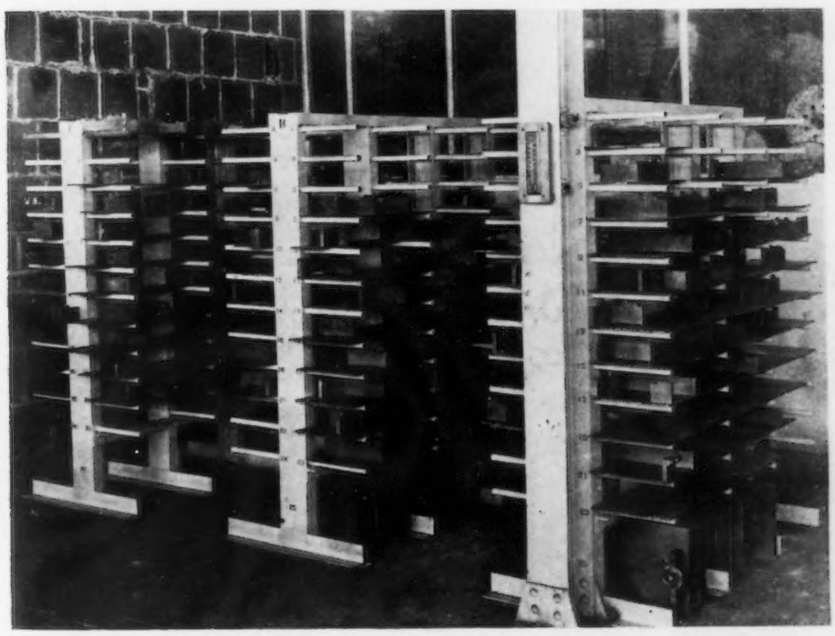
The same dies may also be used on press brakes by attaching them to adapters which are slidably mounted on a standard press brake rail.

With an assortment of Wales dies on hand in a shop, many perforating and notching problems on new parts can be met without delay, a decided advantage in aircraft production. Production of new parts may be started within a few hours after seeing a layout of the blank. The only limitation on the process is that, owing to the compact design, these dies are not suitable for punching material heavier than No. 7 gage in steel or 3/16 in. gage in aluminum. Round hole units can be obtained to punch up to 2 in. holes in No. 14 gage steel. In the larger sizes, from 1 to 2 in., the stripper springs are nested around the punch shank. Throat depths range from 6 to 18 in. on these large dies. On the ¾ in. wide dies with selective strippers, throat depths run from 1½ to 9 in.

Since most of the Wales dies used in aircraft construction are for punching out rivet holes in stringers, shapes, angles and bulb angles made of duraluminum and other aluminum alloys, these perforating dies are made narrow enough to accommodate the usual rivet pitches encountered. The first sets of dies made for use on press brake rails for this purpose were ¾ in. wide, with capacity for punching up to 5/16 in. holes. (See Fig. 6.) New, smaller units are now standard and are made in widths of ⅝ in. with the maximum hole 3/16 in.

These dies are self stripping in action, but one of the problems in connection with their design and

FIG. 3—Simple racks made of welded structural steel and pipe for storage of special templates with rails, but without units in place. These may be attached with screws in a few minutes when needed. This procedure permits maximum utilization of tools.



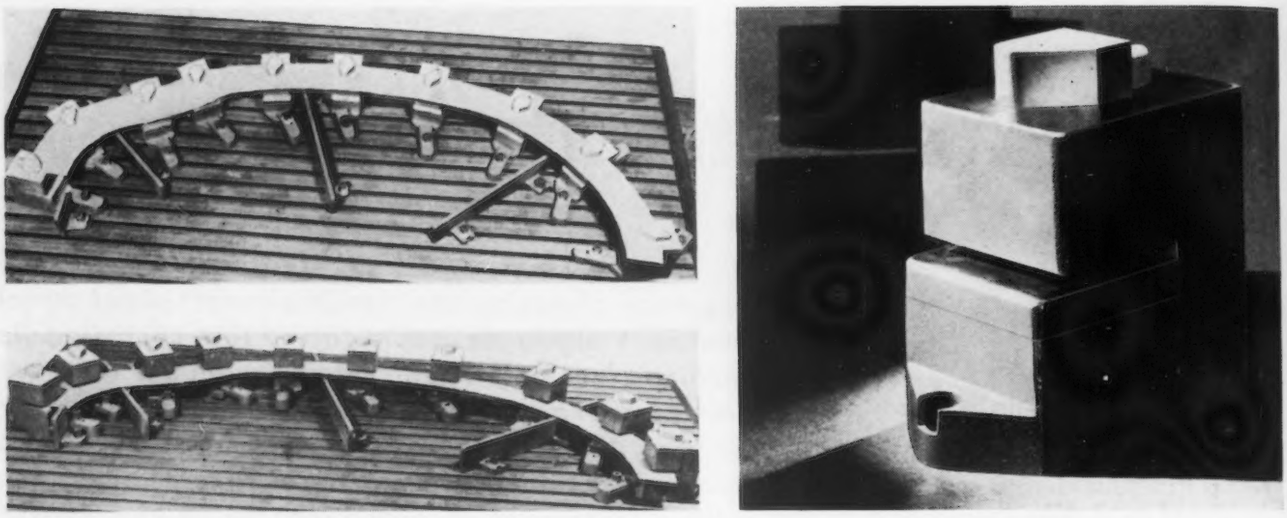


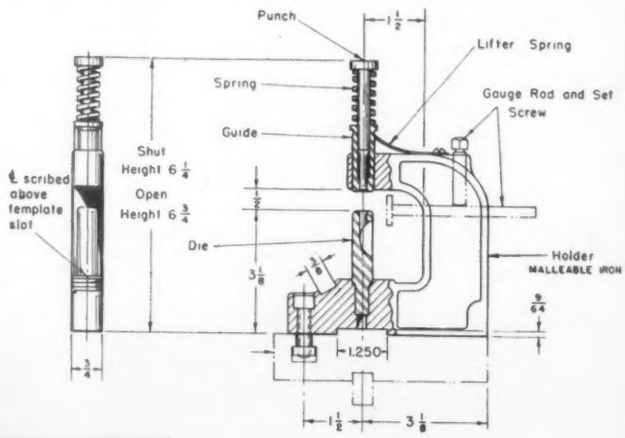
FIG. 4—Setup of Wales notching dies for punching stringer clearance notches in airframe bulkhead members. The individual notching dies are positioned on the special T-slotted bed by means of a template as shown in the upper view. Lower view shows bulkhead inserted in dies ready for notching.

application is the regulation of the stripping pressure so as to accommodate a fairly wide range of material thicknesses.

In aircraft fabrication, hole punching dies are usually ordered to punch a certain thickness of material, such as dural. It is our practice to allow a clearance between the diameter of the punch and the hole in the die of 10 per cent of the metal thickness. Material 0.037 in. thick is a common gage and for it a clearance of 0.004 in. is produced between the punch and die. Many people in industry still have the notion, however, that if a die has the proper size punch in it, it should be able to punch anything that requires punching. However, if a punch and die set with only 0.004 in. clearance is used to punch metal $\frac{1}{8}$ in. thick, the punch is seized by the material to such an extent that the usual single stripper spring will not withdraw the punch from the work.

Because of this, a multiple spring unit was developed which has sufficient power to strip the punch, regardless of whether the clearance is proper. It is obvious, however, that better work will be obtained with less strain on the equipment if the clearance between the punch and the die is as it should be, rather than too great or too small.

Fig. 7 shows a setup of these multiple spring units as used in a large bomber plant. It will be noticed how the multiple spring unit was designed to stay within the limits of the width of the holder, which in this particular set-up is $\frac{3}{4}$ in. An important improvement

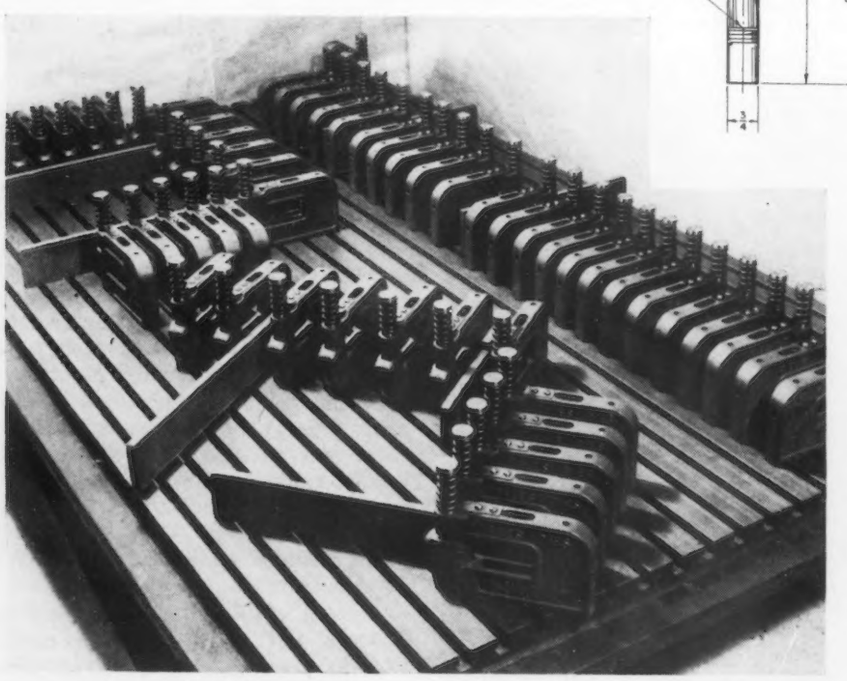



LEFT

FIG. 5—Typical arrangements of hole punching units on a T-slotted bed plate.

RIGHT

FIG. 6—This type of Wales die was originally designed for punching rivet holes in stringers, channels and bulb angles in aircraft construction. Recent modifications extend its utility.



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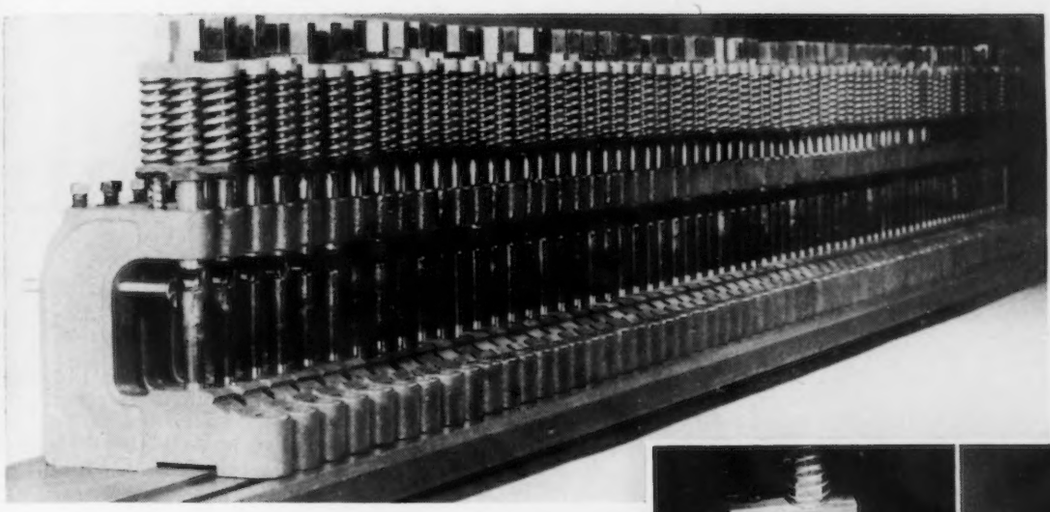

FIG. 7—Multiple spring punching units on detachable press brake rail ready for shipment to a bomber plant. These units are adaptable for punching dural stringers for rivet pitches from ¾ in. up.

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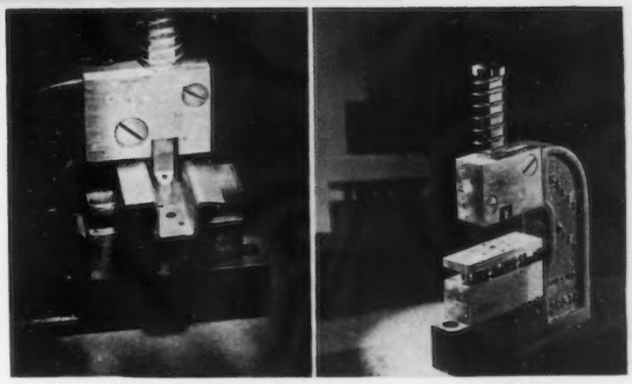


FIG. 8—A recent modification, designed especially for aircraft work, is a punch and die holder that will punch a series of three holes in flat (right) or channelled material (left). These series of holes can be punched in a straight line or at any angle according to the setup of holders on rails or T-slotted plates.

that was developed in connection with these multiple spring units is that the center spring may be inserted or removed merely by lifting the punch out of its guide. Thus, if 200 units, which is not an unusually high number, were mounted on a press brake for punching light material, it would be unnecessary to use three springs for stripping. By removing the center spring, the ram of the press would have to depress only 400 springs instead of 600.

If, on the other hand, three springs were required and the material punched called for considerable power in perforating so that the machine could not depress 600 springs and still push the punches through the material, it would be necessary to remove a sufficient number of holders so that the machine would work properly. The three spring stripper will strip anything that the punch will penetrate.

Another important feature is that, in the original single spring unit, the punch was made with a solid head so that when the punch became dull, each grinding operation shortened the overall length. This made it necessary to set the ram of the press down to compensate for the amount ground off the punch and this, in turn, compressed the spring to such an extent that the life was considerably shortened.

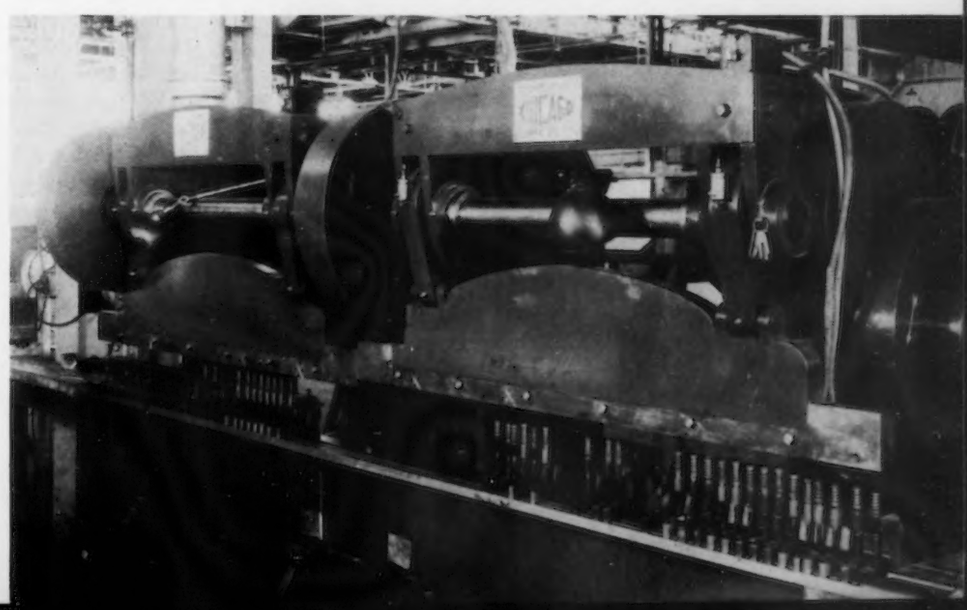
In order to overcome this undesirable condition, an adjustable head was developed for the punch so that as the punch is ground and shortened, the head is backed off to keep the overall length constant. Thus, it is possible always to have the bottom of the punch flush with the bottom of the punch guide and in punching ⅛ or 3/16 in. thick material, the springs are compressed only these amounts beyond the original compression which the assembling of the unit places them under.

Fig. 7 also shows a groove cut into the upper face of these units just in front of the die member. This is for accommodating strip templates made from ⅛ x ⅜ in. strip stock having scribed marks at the desired locations for registering with scribed marks on the centers of the holders.

Some aircraft fasteners require two small rivet holes alongside of a central, larger hole. The die sets in Fig. 8 have been designed to take care of this work, either on flat pieces or in channel sections. These series of holes can be punched in a straight line or at any angle, according to the setup of holders on rails or T-slotted plates.

Fig. 9 shows an interesting setup whereby two press brakes are mounted side by side to punch a large number of holes in long stringers.

FIG. 9—A pair of press brakes set up in tandem to perforate holes in long members. Since the dies are self-contained, it is not necessary to have the two sets of eccentrics operate in synchronism.



# Tool Conservation in

By FRANK J. OLIVER
*Technical Editor*, THE IRON AGE

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TOOL consumption by the United States Navy represents a substantial portion of all cutting tools manufactured. Hence, any steps taken by the various Naval activities, especially the Navy Yards, to conserve these elements so vital to machine tool usage are highly important not only from the point of view of tool supply, but also from that of maximum tool utilization.

Over a year ago, the problem was recognized by the Shore Establishments Division of the Navy Department and steps taken to set up certain practices and to further existing practices, designed to conserve tools in many ways. Much yet remains to be done in getting all the yards to follow the practices of the best of them, and many suggestions have yet to be given further study, but enough has been accomplished to be worthy of recognition by industry as a whole. All of these practices have equal application in any metal working industry contributing to the war effort.

One of the first steps taken was to set up a system, on a much expanded basis, of salvaging or reconditioning various types of high speed cutting tools that had been withdrawn from service due to broken teeth, wear or any other causes which rendered the tools unsuited for further redressing on tool grinding equipment at the various yards and depots. In one yard facilities also have been made available for building up broken teeth in cutters by the atomic hydrogen method, using welding rods forged from high speed steel scrap.

Through the use of negotiated contracts, the types of tool materials ordinarily made available to the yards by restricted specifications were broadened to include not only the new molybdenum type high speed steels, but also cast cobalt-chromium-tungsten tools and the cemented carbides. Provision was also made for the purchase of mechanically clamped forged tool bits to be used on planer, shaper and slotter tool holders.

In general, emphasis has also been placed on the wider use of tool bits in forged holders. One Navy Yard has reported the manufacture of over 400 various adjustable boring bars for use with small tool bits, also the placing in service of various shapes of turning tool holders for use with similar bits. The same yard has also extended the use of inserted blade cutting-off tools in place of forged types.

A great deal of emphasis is being placed on tipping tools with various types of cutting materials and this practice is almost universal within the Navy Yards. One Navy Yard has installed atomic hydrogen welding equipment for tipping material similar to Stellite, etc., carbides and high speed steel, as well as building up broken teeth in cutters as mentioned above.

The Navy has also purchased 50 and 150-kva. resistance welding machines for butt welding high speed steel cutting tips to low alloy shanks. They were installed in the forge shop due to the close relationship to reforging of obsolete forged high speed steel shanks and the heat treatment of butt welded tools. In the few months they have been installed, these machines have proved to be excellent investments and have fully come up to all the expectations of Yard officials.

Exhaustive tests have also been completed on the possibilities of using so-called surplus scrap STS for use as shank material for all types of tipped and butt welded tools and this material appears to fill all the requirements normally found in carbon tool steel. Heat treatment of this steel is such that Rockwell hardness equivalent to tool steel can be obtained. The material is ideally suited for application of inserts and small sections by the atomic hydrogen welding method, thus effecting a great saving in the high tungsten tool steel. A few scrap pieces of this STS steel will make large number of shanks for single point tools for engine and turret lathes. The shank can be sheared from stock up to ¾ in. thickness, allowing 1/16 in. on top and bottom for rough machining. This method has proved more rapid than gas cutting the shank and then grinding to final size.

Progress is also being made in completely forging a cutting-off or parting tool of this material and building up the actual cutting edge with tungsten steel wire drawn out from a surplus piece of high tungsten steel. This building up of the tip is also accomplished by atomic hydrogen welding. Further studies will have to be made of the heat treating procedure, however, before the method can be standardized.

In keeping with this tool conservation program, all Yards were asked to make a complete inventory of all tools on hand and to ultimately reduce stocks to a 90-day supply basis. In this connection, one of the Yards has suggested the complete study and standardization of every tool, including loose, hand or special types. The standardization of adjustable wrenches has also been suggested and an attempt is being made to adopt as standard a few limited designs of portable power tools.

### Molybdenum Type H.S.S.

As regards the molybdenum type high speed steels, as soon as the tungsten situation became critical, all the Yards were given copies of the heat treating report by the Committee of Tool Steel Producers, issued on Aug. 26, 1941, through the then OPM. At the same time a survey was made of all existing

# the Navy

***. . . This article, written from data placed at the disposal of the author by the U. S. Navy Department, outlines many procedures and policies relating to cutting tool conservation and machine utilization that could well be adopted by industry in the furtherance of the war program.***

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heat-treating facilities and new equipment ordered well in advance of the time when stocks of 18-4-1 tungsten high speed steel would approach exhaustion. As is well known, precautions must be taken to avoid decarburization, especially on tools on which the allowable finish grinding stock is limited. Some of the Yards have ordered salt bath equipment for this purpose. Additional preheating furnaces are also being installed since it has been found that preheating at 1600 deg. F. in modern equipment is particularly advantageous not only for the molybdenum type tool steels, but also for the regular 18-4-1 variety.

This whole program of the application of molybdenum type tool steels has been greatly aided by heat-treating tests made at one of the Yards at which point tests on tool steels have been centralized for many years past. Studies on heat treatment here and elsewhere have tended to give better control of the hardening of all tools manufactured at the various Yards.

### Twist Drills

Other studies indicated that the life of twist drills can be greatly extended by the use of proper machine grinding methods. This is another important phase of tool conservation, inasmuch as the Navy uses several million twist drills annually.

Since the sharpening of twist drills and also of single point lathe and planer tools had largely been done by hand for many years, the first step in switching over to machine grinding of all tools was to make a survey of all existing facilities before taking steps to purchase added equipment for this purpose. The Naval Gun Factory at Washington is particularly well equipped in this regard. (See "Tool Control in the Navy," THE IRON AGE, Oct. 16, 1941). This factory uses many of the so-called Sellers "tub grinders" for grinding of single point tools to predetermined angles by mounting the tools in rigid holders having multi-angular adjustments.

Other Yards are also well supplied with machines to accomplish economical grinding of every type of cutting tool.

In the meantime, information has been disseminated to all the Yards on machine grinding of drills to prolong drill life and obtain faster drilling. Experience has proved it advantageous to use drill grinders of such design as to give variable relief back of the cutting edge. All Yards have grinding equipment for machine grinding and point thinning of twist drills. Because it is considered inefficient and wasteful, steps are being taken to prohibit hand grinding entirely at all Yards. Through the Shore Establishments Division an effort is being made to standardize on certain types of drill and cutter grinders in all Navy shops.

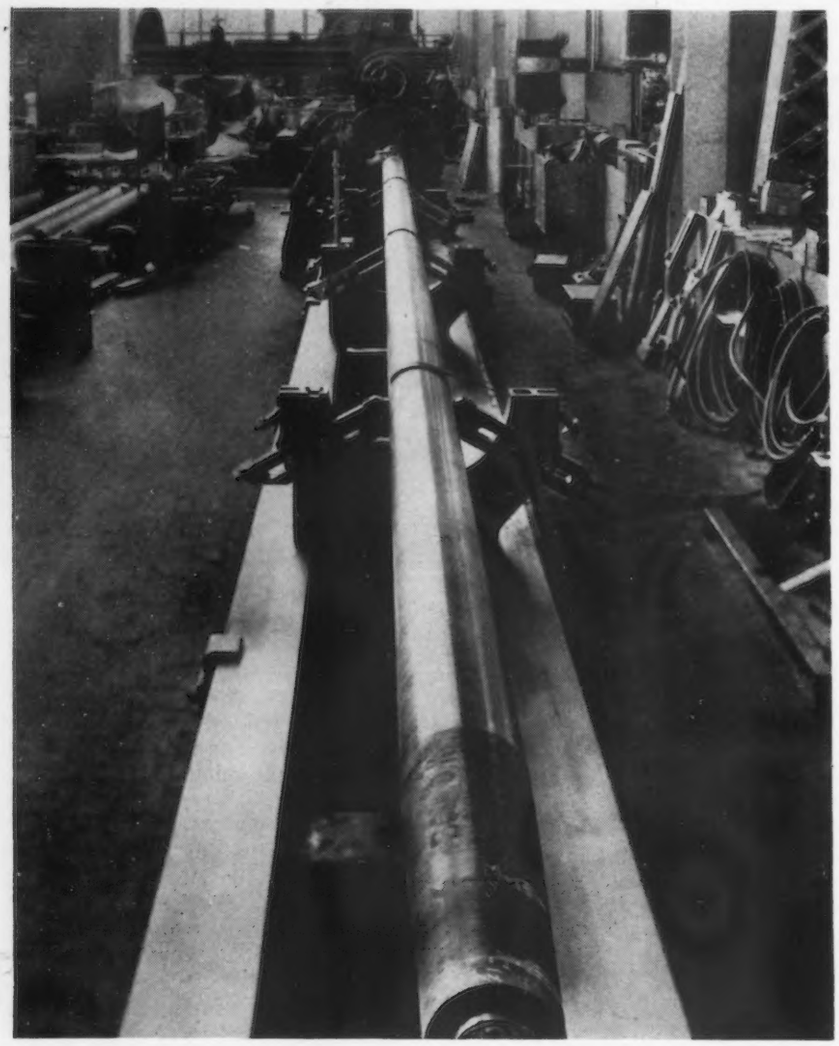
An effort is also being made to centralize the grinding of milling cutters, reamers, countersinks, taps and dies at the various Yards. In this connection a study is planned to further the substitution of molybdenum steel for round tungsten tool steel bar stock used for the manufacture of special milling cutters, reamers, taps and circular form tools.

### Chisels

Steps have been taken toward the development of a design of grinding machine suitable for grinding hand and pneumatic chis-

els. Recent studies have shown the need for uniform grinding of chisels so as to obtain a more uniform service life as well as to conserve this type of tool steel. Hard grinding has been found inefficient and wasteful. The job of building this machine will be sublet.

Proper tool grinding is only one phase of the tool conservation program. The other big factor, and the one directly related to manufacturing efficiency and most effective machine tool utilization, is that of tool usage. For one thing, adoption of new cutting tool materials like cemented carbides has introduced new factors. Always inclined to be conservative in peacetime, the Navy Yards have been faced with the problem of using all available machinery to the limit of their capacity, 24 hr. a day, seven days a week. The Navy has acquired in recent years some of the best machine tools available — machines fully capable of taking advantage of the higher cutting speeds inherent in the new cutting alloys. Now the problem is to step up the whole tempo of machine utilization.



THE efficiency of production of this big lathe shown turning a submarine propeller shaft at the Mare Island Navy Yard largely depends upon the few pounds of tool steel doing the cutting. Machine ground lathe tools and other cutting tools are rapidly replacing hand ground tools in all the Navy Yards. Official U. S. Navy photograph.

For this purpose a definite program has been undertaken to develop a group of specially trained mechanics selected from the Yards who will be thoroughly conversant with the very latest theory and practice of the cutting of metals. These selected men have taken a short intensive training course at a prominent Midwestern university where tests on the cutting of metals have been conducted for many years, and have visited the research laboratory of one of the leading machine tool builders. At these laboratories they have been drilled on the latest data on speeds and feeds used for cutting all kinds of materials and have investigated the influences of various cutting fluids.

In other words, the Navy will now have in each Yard men who not only are thoroughly conversant with the particular problems of that Yard but also are posted on the latest test data on the cutting of all the commonly used materials. Particularly have they been informed on the relationships between speeds and feeds and tool life and the influence of cutting fluids thereon. Based upon actual knowledge of what can and has been done, these men can then confidently begin to push cutting tools a little harder without fear of increasing cutter breakage on the one hand, or spoiled work on the other.

One of the tasks of these highly skilled and trained mechanics will be to establish charts or data on rates of speed and feed for highest production rates in machining all ferrous and non-ferrous metals encountered in the yards. Aside from the data obtained in the field trip, more is being obtained directly from the suppliers of particular types of tools, like carbides, and use is being made of the field engineering service offered by such companies. These mechanics will also help train other tool specialists who ultimately will be assigned to each shop. To assist the yards in developing the men so trained to a higher degree of perfection and to further assist in improving machine shop methods and practices in general a "Navy Department Tool Demonstrator Group" of three men was formed from the mechanics who participated in the initial training program. This group under the supervision of an engineer from the Shore Establishments Division of the Navy Department spent several weeks at each Yard in furthering this cause.

Out of the whole program there is bound to come two important gains:

(1) Conservation of vital cutting materials.

(2) Maximum tool utilization and hence maximum machine utilization.

# Drop Hammer Forming Of Aircraft Parts

By CHARLES H. MILLER,
*Foreman, Plaster Department,*
*and*
ROBERT B. STUBBS
*Foreman, Drop Hammer Department,*
*Bell Aircraft Corp., Buffalo*

FIG. 1—Here a plaster pattern department worker builds a full size mockup of components over templates furnished by the mold loft. This is the first step in the production of dies for drophammer work.

***. . . The extensive use of drop hammers by Bell Aircraft Corp. in forming parts for the P-39 Airacobra, and some of the techniques developed in Bell's plant are described in this article.***

INCREASED delivery commitments made by Bell Aircraft Corp., Buffalo, as its share in the war program have required speedups in all departments in the company's plants. In some cases, the increased volume of work is being handled merely by adding to the working force, but a great amount of research has been required to simplify jobs so that less skilled handwork is needed. The drop hammer department has been particularly successful in the development and use of new techniques which are speeding deliveries of Army P-39 Airacobras. This success comes from reducing work time on forming operations and cutting down the amount of handwork needed after hammering.

New developments have been made in both pattern and die making to increase the value of the drop hammers in manufacturing operations. The pattern technique finding general acceptance today is one making use of a full size mockup. The airframe, as shown in Fig. 1, is divided into the most natural breakdown, indicated by size, continuity of contour, singularity of purpose, or sub-assembly plans. The mockup is made of plaster, with all of the dimensions expanded 0.1 in. to the foot to allow for the shrinkage of the die metal. This mockup serves to prove the curves and sections as defined by the mold loft, as shown in Fig. 2.

After the mockup has been made, plaster casts of the principal components are taken off. The ability of plaster to reproduce accurately the parts provides the key to mass production, that all parts shall fit all airplanes. The ensuing die making operations place emphasis on the refinement of conventional methods, insuring that exact reproduction rendered by the plaster pattern is not lost before the part is completed.

Two basic requirements have directed the development and adaptation of several types of dies to aircraft mass production: (1) To carry the part as nearly to completion as possible, and (2) to keep the die tooling simple. The development of the tooling is, of course, limited by the "flow" of the metal in forming and the amount of wrinkling which the hammer can iron out.

Bell Aircraft specializes in the "developed" method of drop hammer striking. This technique is a treatment for a part involving difficult contours, shaping the part gradually with each step accomplishing as much as the limitations of wrinkling and flow will allow. The main instrument panel for the Airacobra is an excellent example of the type of part "developed" on a series of drop hammer dies. In

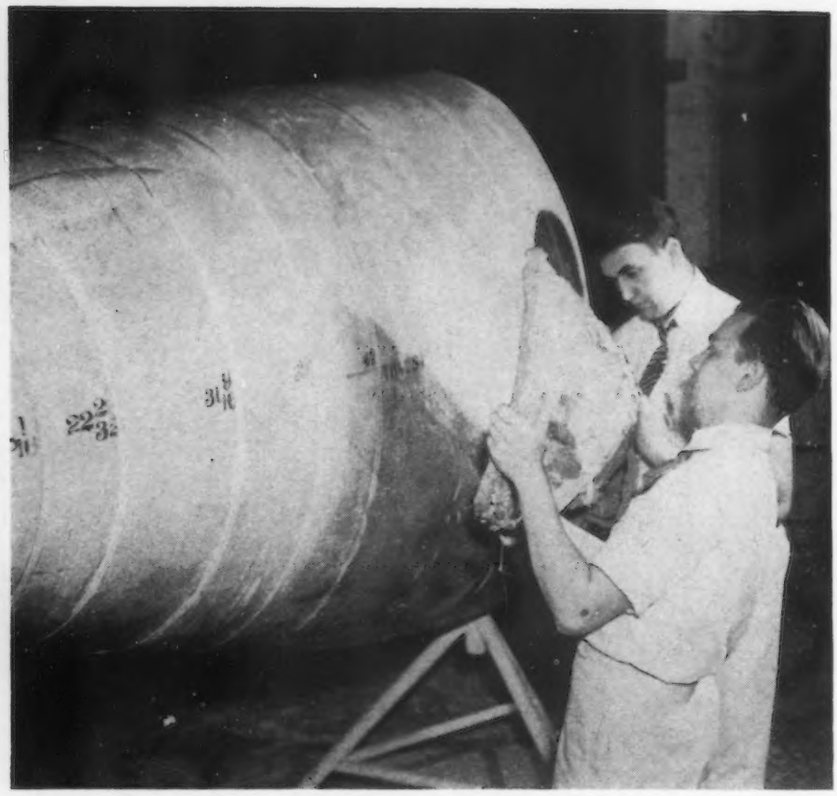
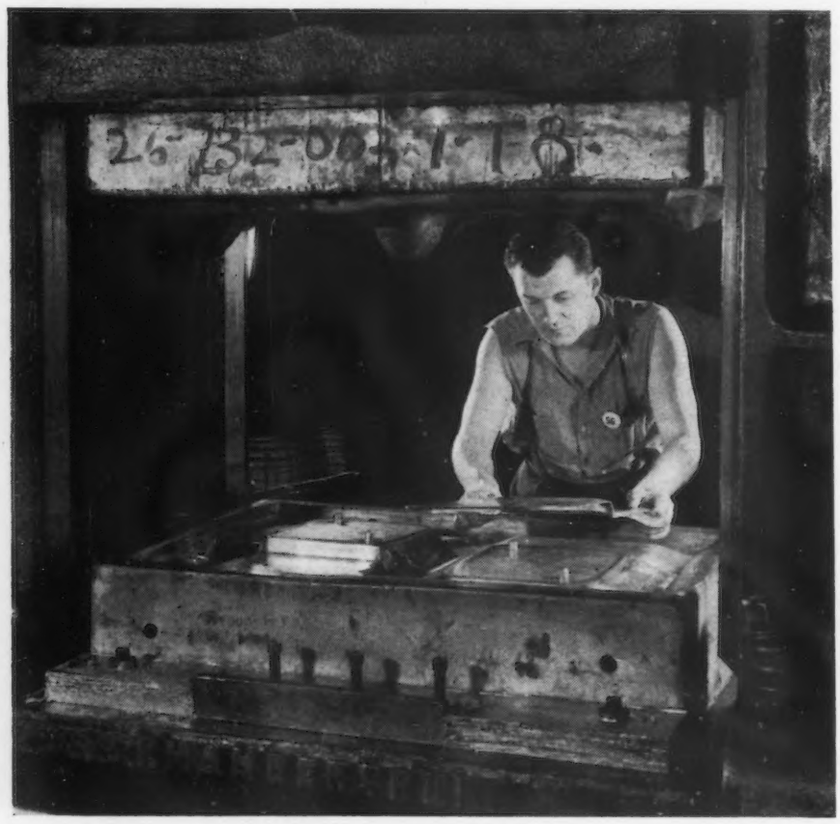


FIG. 2—Patterns for drophammer dies are made of plaster to dimensions and shapes picked up on primary casts from a full size mockup. Bell Aircraft uses this mockup method exclusively to prove the curves furnished by loft.

FIG. 3—This double die performs the first two steps in the forming of an instrument panel for an Army P-39 Airacobra. The die at the right takes the flat blank of aluminum alloy, and forms the sides slightly, while the one at the left forms them to 65 deg. angles.



the finished airplane, this panel is mounted on special shock resistant rubber mounts which require long attaching "ears" on both sides of the panel at right angles to the face.

The panel and the ears were formerly made separately, and then welded together. Time studies showed about one hour was expended on this job. A series of three dies was designed to form and shear the entire part in the drop hammer department. The first die is double, and each subject blank is struck once in each half, shown in Fig. 3. The first operation consists of giving the ears of the flat piece a 15 deg. bend. The piece is then moved to the other side of the drop hammer where the ears are bent to 65 deg. and the joggle across the face is further shaped. In the next, the finish die, forming is completed, as shown in Fig. 4 and the angles are closed to 90 deg. The final die, Fig. 5, shares the holes for the instruments. By the method formerly used, trimming and routing operations were required. The drop hammer method turns out these parts in one-twelfth of the former time.

### Kirksite Trimming Dies

Extensive use is being made of Kirksite trimming dies. Simply made, with a female channel following the cut-off lines of the subject, they are very economical. The channel is 0.5 in. deep and 1 in. wide, and is cast with the die. The die is not allowed to air cool, but is quenched by a process developed by the company which gives a cutting edge with a hardness of 69 Rockwell B or 117 Brinell. The special quench method prevents the granularity and consequent structural weakness which sometimes results from other methods of hardening Kirksite, and yields a tensile strength of 62,000 lb. per sq. in. The actual shearing operation is performed with the subject blank backed with one covering piece of rubber and another ring of rubber extending 2 in. over the cutting channel. The pressure of a smooth punch compresses the rubber into the channel to shear the blank.

A further advance from the shear die is a combination of what is usually template die work and drop hammer work. For certain types of work, if template dies are used for shearing, it is necessary to make drop hammer dies for the same part to form the sheared

parts. Bell is using a combination of the two, and doing the whole job on the drop hammers, using blanking dies. A mating punch instead of backing rubber is used in this operation, and a steel cutting strip is added to the die. A recess is cast into the die to receive the strip, which is easily fitted by a forming die operation. The cutting strip may be inset in either the male punch or the female die. In the case of the instrument panel described, the cutting strip is in the male punch, but on another job, the door frames, the cutting strip is in the female die. The instrument panel is a 0.125 in. aluminum alloy, and some of the instrument holes sheared are as close to each other as 3/32 in.

### Side Action Dies

To bring another type of drop hammer work nearer to completion, extensive use is made of side-action dies to permit closed angle work. Closed angles are usually finished by hand in aircraft work, but the action of these dies, moving in from the sides as the metal forms, simplifies the jobs. To keep the action simple, horizontal movement is achieved by use of oblique planes molded into the dies, and the return is effected by spring action between the halves of the split punch. A standard punch shoe has been developed to adapt the hammer head to this work, and adjustable set screws combine with the vertical action of the hammer to give any desired angle of approach.

Pressure plate dies have been adapted to this type of work to hold parts firmly in place while side action forming is taking place. The pattern is cast in plaster, but instead of casting the punch as a single piece, as is the usual practice, a core is poured in the pattern department for a center section of the punch which will be pressure held. This core is made of plaster and a fibrous material similar to asbestos. The core pattern is set on top of the finished male die when the punch is poured, and lifted out when the Kirksite has hardened. The core is then poured in a separate piece, leaving about 1 in. for spring compression space on the top. When the hammer is in operation, springs under this core make it act as a pressure pad, holding the work in position as the horizontal action takes place. To supplement the work that the drop hammers are doing, a stretch press effectively speeds production

FIG. 4—Parts with right angles are formed by drophammers by using a series of dies. Here is shown the third operation in the development of an instrument panel for an Airacobra, completing the forming operations for this part.

FIG. 5—Template dies are combined with drophammer dies to perform shearing operations in the hammers. The final step in the development of an airplane instrument panel, shearing the instrument holes, is illustrated here.

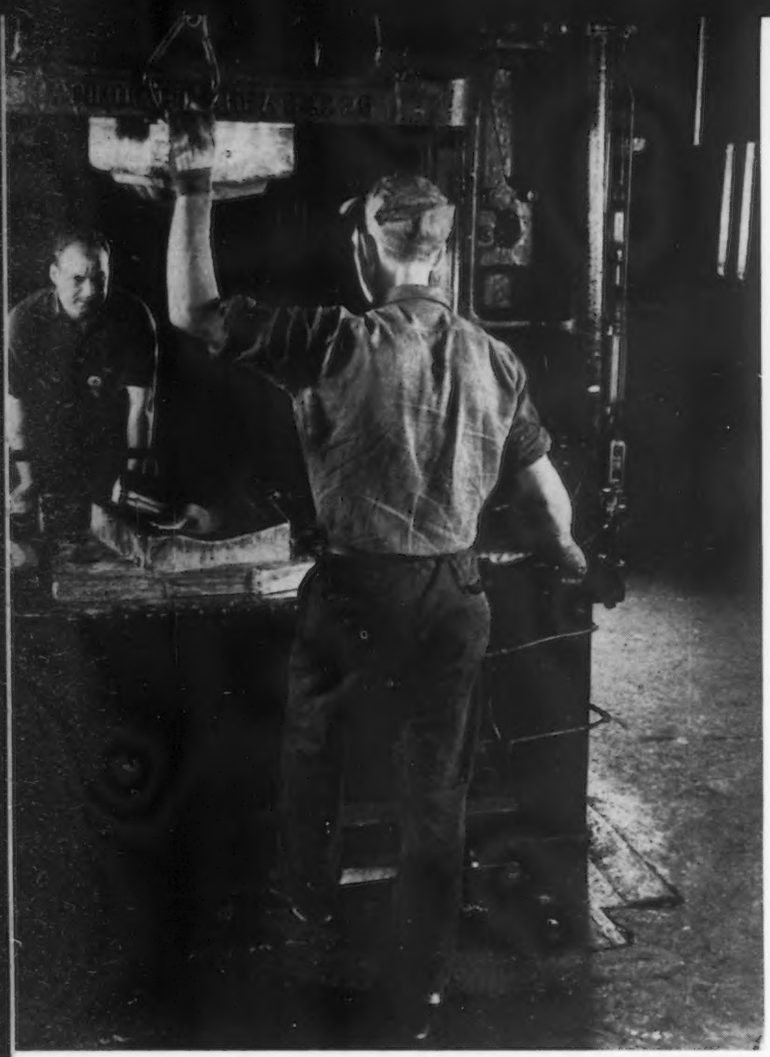


FIG. 6—It takes both hands and one foot for this drophammer operator to stamp a part. The bar in front of the helper in the background keeps him safely away from the hammer.

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of certain parts which require the formation of large shallow curves.

### Door Stampings

Doors for the Army P-39 Airacobra offer a striking example of what Bell Aircraft has been striving toward in its work on patterns and dies. Ordinarily, an assembly of this type is built up of many small parts, which are riveted together. The inner door frame is now being stamped out in one piece and the outer frame in another. These stampings are then spot welded together. Three dies are used to develop one of these assemblies, one being a stage die where preliminary forming takes place, one a finish die where the final forming is done and the last a shear die where the holes are cut.

Similar applications of these types of patterns and dies on other aircraft parts have changed the status of the hammers from that of a tool used to rough out parts too heavy to be formed any other way, to that of a precision tool mass producing quality work to specified tolerances.

Considerable study has recently been given to the problem of safety for the employees in the drop hammer department. Guards have been installed to protect the operator from his own possible carelessness, as well as his machine. A safety bar protects the helper, who works behind the machine, locking the hammer head until he is clear of the bar, and thus safe. Both of the operator's hands and one of his feet are required to actuate the hammer head to guarantee that he will be out of the way when the head drops, as illustrated in Fig. 6. Motion studies and research are constantly being applied to this problem to assure the workmen maximum protection.

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# Induction Heating Brazes 300 Pieces an Hour

A PROBLEM involving the brazing of a ¾-in. threaded flange into a completely closed 20 gage sheet steel container has been solved very efficiently by induction heating of a silver brazing alloy.

The pre-placed ring is melted and formed into an air-tight joint by means of inductors placed directly over the flange. These inductors, which heat the flange and a small area of the steel container, are energized by a model 1070 Thermonic induction generator. The equipment handles three brazes simultaneously, with the induction heat applied by push button and automatically controlled.

The strength of the braze is said to be equal or superior to that of the original metal. Temperature is controlled exactly to the brazed area and the areas adjoining it, with no annealing beyond, and no metallurgical change. The unit makes three brazes simultaneously every 35 sec., a rate of approximately 300 an hour. Induction Heating Corp., 389 Lafayette St., New York, is the manufacturer.

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THREE simultaneous brazes every 35 sec. is the rate at which this induction heating unit applies threaded flanges to these closed steel containers.

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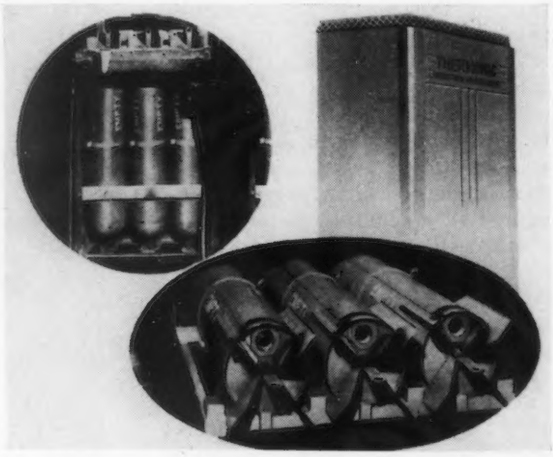


# Semi-Automatic Contour Control

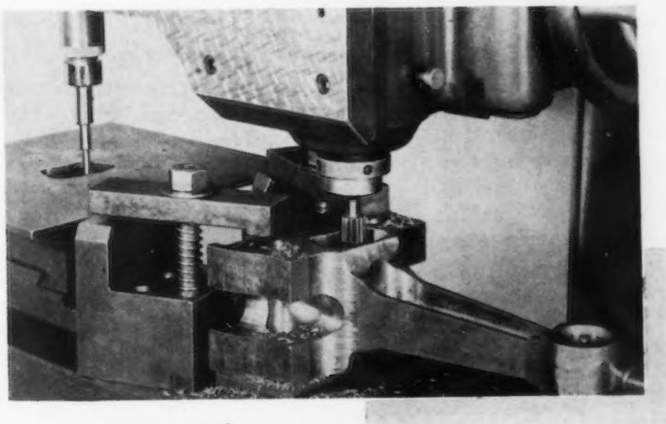
## For Standard Milling Machines

A SEMI-AUTOMATIC control, applicable to standard machine tools, is being used in a major aircraft engine plant for contour milling of connecting rods. The new attachment performs at speeds and accuracies considerably beyond the capacity of hand operation. A product of the Detroit Universal Duplicator Co., it controls both the transverse and longitudinal feeds of a Reed-Prentice vertical milling machine in much the same manner as would an operator using manual control alone. Manipulation of feed screws by the Duplimatic is in accordance with the outline of a template mounted on a table with the work.

A tracer mechanism is fixed to the head of the mill and remains immovable, as does the cutting tool. This tracer is connected with the control, so that the Duplimatic moves the table — and, of course, the work and template—just sufficiently to keep the template against the tracer finger at a predetermined pressure. The touch is so sensitive that if the movement causes any change in this pressure the Duplimatic instantly reverses the travel and re-establishes the proper contact.

The milling cutter moves along a path identical to that of the tracer, and when it reaches a corner of the work the operator presses the proper "change of direction" button. However, this need not be done at any particular point of the radius. If the operation requires both a roughing and a finish cut, the same procedure is followed, except that a slightly smaller diameter tracer finger is used for finish machining.

No major changes in the machine tool are necessary. Separate hydraulic motor drive heads replace the longitudinal and transverse feed handwheels; the tracer is readily removable; and the portable control mechanism can be placed where it is convenient to the operator.



BELOW

FIG. 2 — Duplimatic control equipment consists essentially of a hydraulic pump unit, control panel, feed screw drive heads and tracer.

ABOVE

FIG. 1—Milling contours in connecting rod cavities with an electro-hydraulic control mechanism fitted to a standard milling machine. The attachment increases speed and accuracy.

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# Carbide Dies

## *For Drawing and Sinking Metal Tubing*

By EARL GLEN
*Carboloy Co., Inc.*

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WITH the necessity for greater output in the production of tubing, there has been evidenced recently a widespread increase in the use of carbide dies and mandrels for tube drawing. Such dies and mandrels are being used today for drawing tubing as small as 0.013 in., for hypodermic needles, and as large as 3½ in., with even larger sizes possible.

Primary advantages of carbide mandrels and dies are: (1) Longer die and mandrel life, (2) higher drawing speeds, and (3) lower cost over life of die. Carbide die life, when drawing steel tubing, is measurable in millions of feet, and experience to date has shown an average carbide mandrel as having a life in excess of 200,000 ft., while some have run well in excess of 500,000 ft. of tubing.

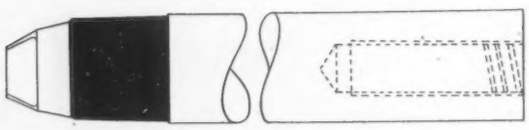
With carbide dies, experience has shown that higher drawing speeds are possible even with much of the older equipment. Usually, tube drawing speeds run around 25 to 50 per cent or more in excess of those for the same job when using steel dies.

As to cost, it is generally estimated that a Carboloy die pays for itself at around 200,000 ft. of steel or brass tubing. This seems to hold true for most sizes. Some carbide dies, especially when resized to draw progressively larger tubing than on the original run, show production records well above 8,000,000 ft. of steel tubing, and on aluminum tubing, die life is even greater. On copper and stainless steel tubing, while total die life is shorter, dies pay for themselves at considerably less than 200,000 ft. Stainless is almost universally drawn with carbide dies today.

Some forms of copper tubing, particularly the nickel-coppers in 1 to 2½ in. sizes, as used for condensers, are now being drawn almost universally through carbide dies. For drawing common steel tubing, both carbide dies and carbide mandrels are being used increasingly, due, in addition to the higher drawing speeds and lower cost previously mentioned, to the advantages of longer runs before die change, decreased setup time, better finish obtained, and reduced die pick-up. The better finish obtained, however, is not an inherent characteristic of the carbide material itself. Just as good finish can be obtained with steel dies when the production run is first started. The difference is that the finish soon deteriorates with steel dies while it is maintained over a long run with carbides.

### Carboloy Mandrels

Fig. 1 is a highly effective design of Carboloy mandrel for tube drawing. The carbide portion, shown in black, is usually tapered approximately 0.010 in. over the nib length; this taper simplifying reconditioning. When new, the tubing will hit the nib near the small end. When wear occurs, the nib is merely polished, reducing the diameter over the entire nib length slightly. When re-applied, the tubing now hits the nib slightly farther back. The same process



LEFT
FIG. 1—Shape for a steel tubing drawing die.

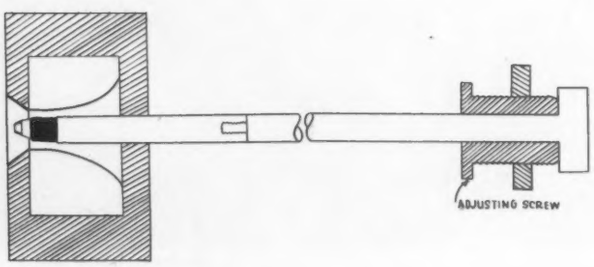



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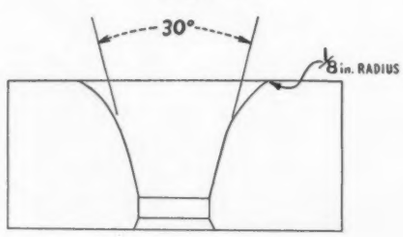
FIG. 2—Details of the steel tubing draw die.



can be repeated until the maximum nib diameter (at the large end) is reduced below the minimum size.

While this design is apparently most effective in insuring long mandrel life, it does depend for its efficacy to some extent on the accuracy of mandrel adjustment available in the equipment. Usually, lengthwise adjustment of mandrels is by either screw or hydraulic mechanisms. Where proper adjusting means are not available, straight nib carbide mandrels are often used. These Carboloy mandrels are available in standard sizes running from 0.424 to 2.250 in.

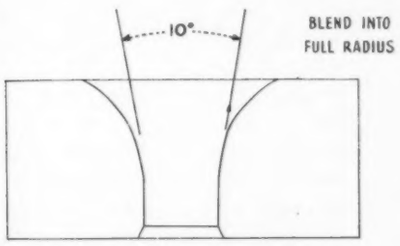



Fig. 3—Steel tubing sinking die.

measured at the heel diameter of the nib, with larger or smaller sizes available on special order.

### Die Design

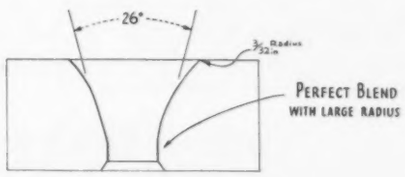
Carboloy tube drawing dies are designed to be used interchangeably with steel dies. There is considerable difference between die designs used to produce tubing by sinking and by drawing respectively, as shown in Figs. 2 and 3. Sinking dies are characterized by small approach angles and long bearings, whereas draw-dies for steel tubing have a larger approach and a shorter bearing length. Draw-dies cannot be used for sinking since the work would come out of the die undersize.

The reason for the long bearing in sinking dies is to help keep the tube round and straight. When the die wears and tubing starts to come out oversize, it is necessary only to re-lap the die, sharpening the angles while maintaining the same bearing length. The tubing then will come out to correct size again.

The use of large angles in carbide tubing draw-dies is based on the general practice of taking relatively large reductions per pass. With carbide dies, the usual practice is to reduce diameter approximately ⅛ to ¼ in. per pass, although there are successful installations where, say, 2⅛ in. tubing is produced in one pass from 3 in. stock. In draw-dies, bearing length is not particularly important since most of the wear on the die falls in the approach angle section at the point where the diameter of the opening corresponds to the diameter of the stock being drawn.

There is considerable difference in design also between carbide dies used for drawing steel tubes and those for drawing or sinking tubing of copper as will be noted from Figs. 3 and 4. Dies for copper represent a cross between steel tube sinking and steel tube drawing dies. To avoid chatter the approach angle in such dies is blended into the bearing with a large radius. This is not the case with steel tube draw-dies. For copper, there is little difference between drawing and sinking dies and they can be used interchangeably.

Cases for carbide tube drawing

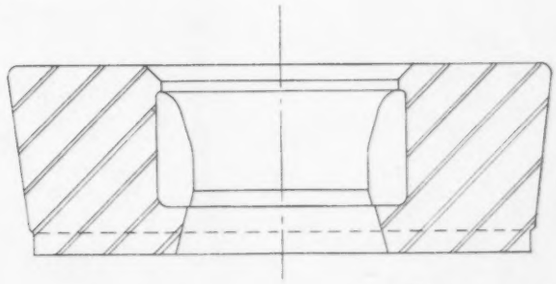



ABOVE

FIG. 4 — Copper tubing drawing and sinking die.

RIGHT

FIG. 5 — Cases for carbide tube drawing dies, showing tapered design.



dies are generally of tapered design, as shown in Fig. 5. This insures firm seating of the dies, permitting smaller die depths to be used, with consequent ability to shorten the length of tube to be pointed. It also makes a backing plate unnecessary. The undercut shown on the die case in Fig. 5 is provided to simplify chucking when reconditioning dies.

Usually, when carbide nibs wear oversize in draw dies, the practice is to re-cut the nibs up to the next larger tubing or draw diameter. When sinking dies wear oversize, the usual practice is to sharpen up the angles, bringing the work back to size again, since the diameter of the work, in sinking, is dependent more on die angles than on die size —with the tendency for the work to run toward the small size.

### Die Selection

Since carbide dies can be reconditioned fairly simply with standardized equipment available from carbide die producers, most mills recondition their own tube drawing dies. An added advantage of such a procedure is that it permits the mill to purchase tubing dies in rough cored or drilled form for finishing by the mill itself; thus materially reducing initial die cost.

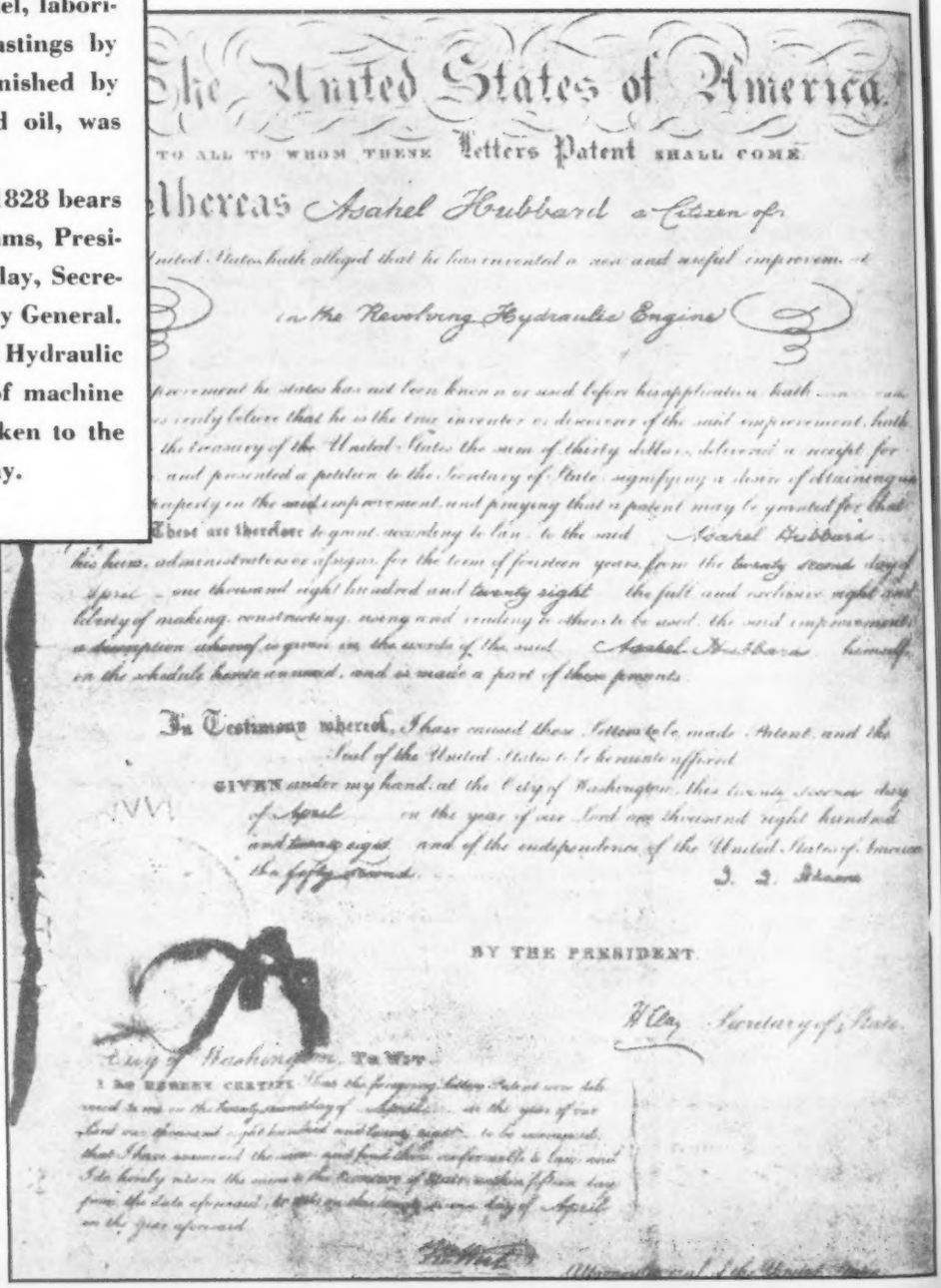
Selection of die sizes when tooling with carbides depends on mill conditions. For dies over 1 in., it is normally most economical to figure on one or two re-cuts to larger sizes. Mills not having larger sizes to run would find it most economical to purchase dies at their maximum size.

Fundamentally, the better the lubrication and the lubricant, the longer the die life. Apparently carbide dies are not very critical, however, as to the method of applying the drawing compound. There is little difference in this respect between carbide and steel dies, and practice differs rather widely. In some mills, tubes are dipped in the compound before drawing. In others, a stream of compound is directed right at the die while mandrels are drilled to lubricate the inside diameter of the tube under pressure as well as the outside diameter. In some mills, a concentrated form and in others a dilute form of dope is used, all with apparently equal success.

# JOHN QUINCY ADAM

**At his watermill in the West Parish, Asahel Hubbard experimented with his "Revolving Hydraulic Engine." Models made of wood were tested, rejected, modified and refined. At last a working model, laboriously formed from rough iron castings by the lost art of "chipping" and finished by grinding with powdered glass and oil, was assembled and found successful.**

**The patent granted April 22, 1828 bears the signatures of John Quincy Adams, President of the United States, Henry Clay, Secretary of State, William Wirt, Attorney General. This marks the birth of the National Hydraulic Company beginning a long chain of machine industries that comes down unbroken to the Jones & Lamson Machine Company.**



The United States of America.

TO ALL TO WHOM THESE Letters Patent SHALL COME

Whereas Asahel Hubbard a Citizen of

United States hath alleged that he has invented a new and useful improvement

in the Revolving Hydraulic Engine

improvement he states has not been known or used before his application hath

verily believe that he is the true inventor or discoverer of the said improvement, hath

the Treasury of the United States the sum of thirty dollars, delivered a receipt for

and presented a petition to the Secretary of State, signifying a desire of obtaining an

property in the said improvement, and praying that a patent may be granted for that

These are therefore to grant, according to law, to the said Asahel Hubbard

his heirs, administrators or assigns, for the term of fourteen years from the twenty second day of

April one thousand eight hundred and twenty eight the full and exclusive right and

liberty of making, constructing, using and vending to others to be used, the said improvement,

a description whereof is given in the words of the said Asahel Hubbard himself,

in the schedule hereto annexed, and is made a part of these presents.

In Testimony whereof, I have caused these Letters to be made Patent, and the

Seal of the United States to be hereunto affixed.

GIVEN under my hand, at the City of Washington, this twenty second day

of April in the year of our Lord one thousand eight hundred

and twenty eight and of the independence of the United States of America

the fifty second.

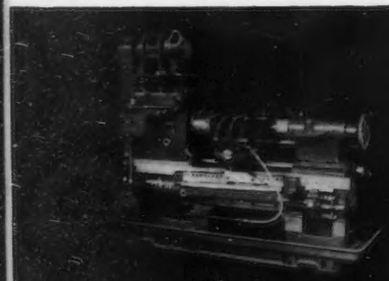
J. Q. Adams

BY THE PRESIDENT

H Clay Secretary of State.

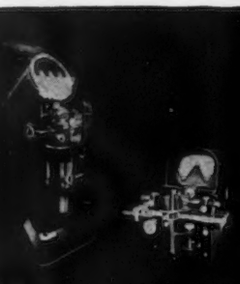
City of Washington, To Wit:

I DO HEREBY CERTIFY That the foregoing Letters Patent were delivered to me on the twenty second day of April in the year of our Lord one thousand eight hundred and twenty eight to be examined, that I have examined the same and found them conformable to law, and I do hereby return the same to the Secretary of State within fifteen days from the date aforesaid, to wit, on this twenty second day of April in the year aforesaid.

FAY AUTOMATIC LATHES

AUTOMATIC THREAD GRINDERS



OPTICAL COMPARATORS

AUTOMATIC OPENING DIE HEADS

# ...AM Signed our BIRTH CERTIFICATE

OUR determination to test, reject, modify and refine, links us with the past and points ahead into the future. Whenever invention born of necessity in a time of emergency has developed new materials or new methods, we at Jones & Lamson have been ready with advanced machine tool technique, and those who have depended on us have not been let down.

No matter how preoccupied with today's production problems, you cannot fail to benefit by contacting a company that has so consistently maintained leadership. Whether your organization is large or small your inquiry will receive the careful, detailed study of our engineers.

Send your questions today and ask for our illustrated catalogs.

## JONES & LAMSON
## MACHINE COMPANY

*Manufacturers of* Ram & Saddle Type Universal Turret Lathes . . . Fay Automatic Lathes . . . Automatic Thread Grinding Machines . . . Comparators . . . Automatic Opening Threading Dies and Chasers

*Springfield, Vermont*
**U. S. A.**

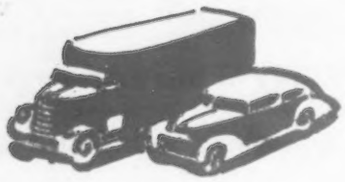
SADDLE TYPE
UNIVERSAL TURRET LATHE

PROFIT PRODUCING
MACHINE TOOLS

RAM TYPE
UNIVERSAL TURRET LATHE

# Assembly Line . . .

**• Detroit admits truth of some claims against its war output activity, denies others, points to increase to $413 millions in July production.**



DETROIT—Following closely on the heels of vague charges from Washington that all was not serene on the production front in Detroit, was a blast in one of the national magazines and another from J. H. Kindelberger, president of North American Aviation, Inc., that the big things promised by Detroit are not forthcoming. This is not the first barrage leveled at the city, and probably will not be the last.

Earlier this year the self-same Mr. Kindelberger stated that the automotive plants have "not delivered a single aircraft sub-assembly in 16 months," a statement refuted by the fact that his own company had been receiving parts and sub-assemblies from the Fisher Body Division for some time. Other parts and sub-assembly producers, such as Briggs and Murray, likewise refuted his statement.

The operation of the automotive industry in Detroit on war production requires rather careful consideration. First of all, it is necessary to point out that the prime requisite for production of aircraft, tank, or any other type of parts or finished products is "orders." The orders must be placed before work can begin on such items. Long before America entered the war, Detroit industrialists were in Washington trying in vain to pin down the government on what was actually wanted and to obtain orders for such material. At that time, political bigwigs were making grand speeches on what could and would be produced by the great automotive industry in Detroit. Production figures were quoted and batted back and forth on the industrial trapeze. However, still no orders were placed.

Later, an Army official stated that Willow Run was in production on the B-24 Consolidated bomber, a phrase that was misleading because at the time there was no assembly line scheduled to be in production of bombers, there is none today, and there will not be any for at least another month or two. Again, garbled facts were picked up and bandied about.

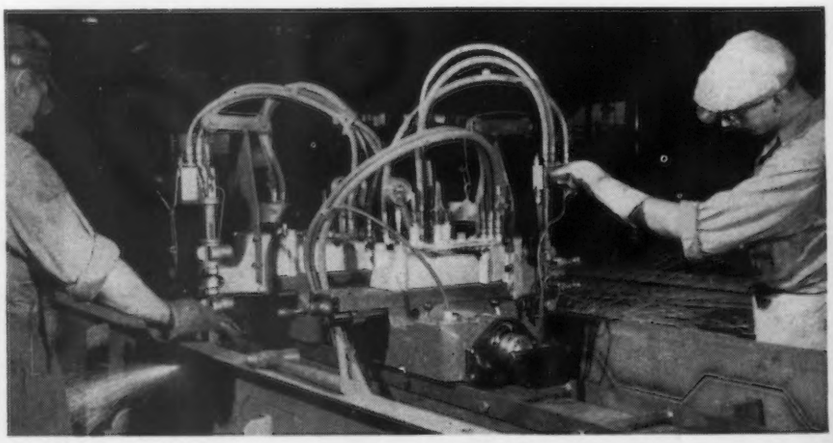
Then came the barrage from a leading national weekly that Detroit was far behind in its production schedule, strikes were common everyday occurrences, and that unless something was done, Detroit would lose the war for the United States.

TRUE, there may be much to be desired with conditions as they exist in Detroit, both from a labor and a production standpoint. However, Detroit is not alone in this predicament, nor is it near to being the worst. True, Detroit has had strikes, work stoppages, and in some instances even lower production rates on some items than were promised originally, but these were the exception, not the rule. Both production and rate of production have steadily increased with the expansion of the war program, which, factually, really only began after Pearl Harbor. Figures compiled showing the value of monthly shipments and the value of the annual production rate during that month from 205 major automotive plants working on prime contracts show this steady increase:

| *Month* | *Value of Actual Deliveries* | *Annual Delivery Rate* |
|---|---|---|
| January | $172,734,000 | $2,072,808,000 |
| February | 194,851,000 | 2,338,212,000 |
| March | 257,168,000 | 3,086,232,000 |
| April | 286,883,000 | 3,442,596,000 |
| May | 293,626,000 | 3,523,512,000 |
| June | 373,363,000 | 4,480,356,000 |
| July | 413,712,000 | 4,964,554,000 |

The continual increase in both monthly deliveries and annual rates as shown by these figures certainly indicates that Detroit is not seriously hampered by layoffs, strikes, production stoppages, etc. There is,

**FLAME JIG SAW: U-shaped channels are being split in half to provide stiffeners for structural use. The 33-ft. channels are loaded two at a time onto a special jig and clamped into place. Two oxy-acetylene cutting machines are employed, riding a track in the center of the jig. Each blowpipe is mounted on a floating mechanism the bottom of which rides along a templet, thus automatically producing the zig-zag line of cut in the base of the channel. This design of cut is selected because it results in a saving of weight and steel while the necessary strength to the beam is maintained. The two cutting machines, splitting two channels simultaneously, travel at a constant speed of 16 in. per minute. Photograph courtesy of Linde Air Products Co.**



# NEW SKILLS from VETERAN TOOLS

WHAT'S true in the Army is just as true in the shop these days. New problems demand new skills from the man and from the tools. *Adaptability* has become a highly important word.

Bullard Vertical Turret Lathes were among the first to prove their fitness for wartime service. These veterans of fast production go right ahead handling such jobs as compressor cylinders and pipe flanges, or switch to airplane and tank parts.

Five tooling stations on the main turret and four tools on the side head permit nine different operations at one chucking—two heads cutting simultaneously.

Use your Bullard V. T. L. for every job you can find—use it to its utmost capacity. Our field engineers will help you.

**Bullard V.T.L. s have these characteristics**

Vertical Design • Rigidity and Power for Carbide Tools • 5-Face Turret on Main Head • Centralized Control • Rapid Power Traverse of Main Head • 4-Tool Turret on Side Head • Simultaneous and Independent Head Functions

# THE BULLARD COMPANY

## BRIDGEPORT, CONNECTICUT

however, one serious problem that Detroit industry faces right now, and that is the problem of getting sufficient material to do the jobs that are scheduled. Material shortages are expected to cause operation curtailments in many plants to at least part-time production within a very short time, but surely this cannot be laid to the doorstep of the automotive industry.

There arethings that have curious implications about the charges that have been laid against Detroit. Mr. Kindelberger's most recent claim, that Detroit hasn't delivered a single airplane, and his former assertion that it hadn't delivered sub-assemblies, are strange. He is, without a doubt, one of the best informed men in the aviation industry and is the president of a General Motors Co. affiliate. However, his recent claims can be directed at one and only one company, and that is the Ford Motor Co., which until very recently, was the only Detroit firm that had orders for completed airplanes. People are beginning to wonder why he is sharpshooting at Ford.

SOME of the closest followers of the Detroit situation in both the daily newspaper and the industrial paper field are more than willing to take issue at the recent charges, because they have watched the war industry grow in the city, and know what its achievements and shortcomings have been and are. However, in a few short days, the "experts" of a national magazine move into the city, read all the newspapers and magazines, talk to a half-dozen or so people, and then step out and write a story "revealing all and telling the low-down" on what is happening. It's really a bad situation when a public-opinion molder such as this puts across to a news-starved American public such accounts.

An interesting conversion story came to the fore this week when it was discovered that a one-time producer of door trim and other accessory auto parts was already in production on turrets for bombers and would soon be in production on brass cartridge and shell cases. While the total ultimate output on bomber turrets by this firm is censorable, it might be said that monthly production will be quite substantial. All indications at present point to peak production within a few weeks, and the manufacturer believes that through methods developed in his plant, the cost of the finished turret can be reduced about $1700 apiece, a saving that will revert back to the government.

For the production of brass cartridge and shell cases, completely revised and new equipment was necessary. All of this equipment has been delivered and as soon as installations can be completed production will begin. The new equipment consists of semi-automatic clearing presses, annealers, and washers, and cost upward of $450,000. The production of the shells will be almost completely automatic, and an under-floor conveyor belt system has been installed to move the material through the progressive manufacturing phases.

ASIDE from the equipment owned by automobile companies that has been sold as scrap, the question has often been raised as to what was done with the tools, presses, welders, and other pieces of production machinery taken from the plants during the last few weeks of automobile production, prior to the plants converting to war work. Nearly 9000 machine tools and other metal working machines have been distributed throughout the country during the last six months.

One automobile manufacturer opened its press room on a "come and get it" basis, turning over this equipment to any manufacturer that could prove he could use it in war production, while many of another company's presses were shipped to a converted plant in West Virginia. A shipbuilding company in Mississippi took over the welding equipment of one company. The sewing machines used in sewing automobile upholstery and fabric parts were purchased by the State Department and shipped to Eastern California, where the re-located Japanese are now making tents and tarpaulins for the armed forces.

Through efforts of the Machine Tool Listing Service of the Automotive Council for War Production, many exchanges of productive equipment have been affected. For example, a Massachusetts factory, having proved to the Army and Navy that it could save time by stamping a bomb sight part which was formerly machined, found the required presses in the Detroit area, lying idle after auto plants stopped manufacture. Some 50 coining presses for coining 37 and 40 mm. shell blanks were found, the lack of which had been holding up production of these necessary war items.

Four automobile manufacturers have already started production of a new TD or tank destroyer type truck. Capable of speeds up to 70 mph., these motorized vehicles are lightly armored and heavily armed. Their guns, in several calibers, are mounted to fire forward in the direction of travel. While a prototype has been in use by the Russians and another in the self-propelled 88 mm. siege cannon which the Germans have been using in Libya, this is the first time this type of weapon has been used by American forces.

The tank destroyers can easily out-race and out-maneuver the tanks and either shell them from a distance or sweep in close, attack from short range, and then run for cover. "The idea is to catch the adversary sitting in his corner with his back turned and hit him."

## *Auto Industry Tops Peacetime Rate 20%*

*Detroit*

**• • • The automotive industry during August is turning out armaments for the United Nations' armed forces at a rate of $13,600,000 worth a day, and at an annual rate that exceeds by more than 20 per cent the average pace achieved in the peak of civilian production, the Automotive Council for War Production announced. Before the end of this year, monthly shipments are scheduled to be running at an annual rate of more than $8 billion, and at peak production, assuming that materials are available to simultaneously process all contracts at scheduled levels, the industry will be operating on a $12 billion annual basis.**

**During July, automotive arms producers shipped war material valued at $413, 712,000, a daily schedule of nearly $14 million. The problems of adapting automotive mass production techniques to armaments manufacture, said the Council spokesman, are largely solved, and today's productive levels are far higher than recorded estimates of six months ago.**

# SIMPLEST ANSWER TO POWER PROBLEMS

**Today's race against time demands modern bus duct systems . . . built for mass production . . . engineered to save installation and maintenance time . . . designed for quick production changes**

Within a few brief months, the *impossible* has become *routine* in American industry. There is reason for pride—and hope—in that fact. But how has it been accomplished? By multiplying hours of work. By developing new and better methods. By short-cutting every step of every job. By finding simple answers to *complex* problems.

Distribution of power and light to machine tools was one of those problems—complex because of the vast size of modern war plants, because of constant changes in production set-ups, because of the urgent call for *speed, speed, speed!*

Yet there was a simple and easy answer to this problem — BullDog Plug-In Bus Duct Systems, which today are serving hundreds of key plants in which this war production miracle is being accomplished.

**Simple to Build—Install—Convert**

BullDog Bus Duct is *simple* in design — speedily manufactured by mass production methods.

BullDog Bus Duct is *simple* to install, follows the roofers down the building. Machines can be plugged in anywhere — and go to work. Days, weeks, even months, of production time are saved.

BullDog Bus Duct is *simple* to convert to any production change —readily moved or extended—and 100% salvable.

A straight line is still the shortest distance between two points. BullDog Systems deliver power and light *direct* to machines at highest efficiency—with a minimum use of war-scarce materials. They are the *simplest* answer to one of industry's most important problems.

The complete installation in this great ordnance plant, one of the largest of its kind in the world, comprises miles of BUStribution DUCT, thousands of protective plugs for plugging in individual machines, and many BullDog switches and panelboards. "It would have been practically impossible," says the Electrical Superintendent, "to distribute power efficiently with any other system."

**No other system meets these wartime needs**

**Power and light *where* they are needed, *when* they are needed.**

**System can be installed in new plants without waiting for machine layout . . . and machines can go to work as soon as the roof is on.**

**Tool set-ups can be changed, machines moved, without interrupting light or power.**

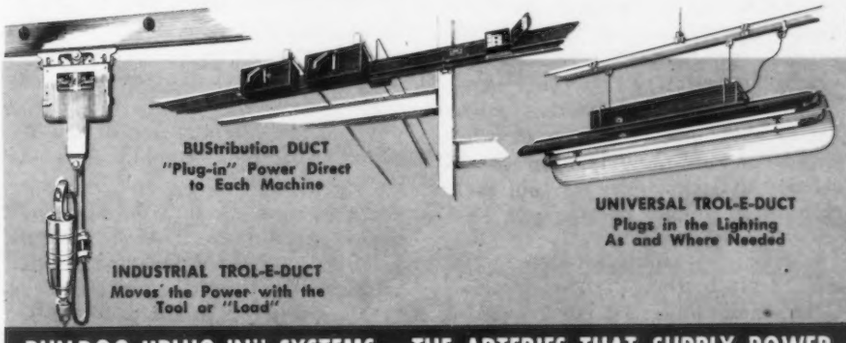
**Power operates at higher efficiency, with less voltage loss, than in any other system.**

**An enclosed system, protected against breakdowns, sabotage and short circuits.**

**System is engineered for maximum efficient use of war-scarce materials. No rubber needed. Valuable aluminum saved for more critical war purposes.**

**Installation in a fraction of the time required for old-fashioned wiring.**

**Standard, interchangeable sections — 100% salvable. Instantly convertible from one production set-up to another.**


BUStribution DUCT
"Plug-in" Power Direct to Each Machine
UNIVERSAL TROL-E-DUCT
Plugs in the Lighting As and Where Needed
INDUSTRIAL TROL-E-DUCT
Moves the Power with the Tool or "Load"

**BULLDOG**
**ELECTRIC PRODUCTS CO.**
DETROIT, MICHIGAN

BullDog Electric Products of Canada, Ltd., Toronto, Ontario

Field Engineering Offices in All Principal Cities

**BULLDOG "PLUG-IN" SYSTEMS—THE ARTERIES THAT SUPPLY POWER AND LIGHT FOR WAR PRODUCTION**

# Washington . . .

**• New War Scheduling Board proposed in General Motors' warrant plan for production control . . . Agency would tell Army, Navy and other departments how much material each can authorize monthly for end products.**

WASHINGTON — The General Motors Corp. has devised a warrant plan for war production control and material distribution and has submitted it to the war agencies here as a possible substitute for the priorities system. The GM Plan would create a new government bureau, tentatively named the War Scheduling Board, to assume control of the military programs. WPB would not be abolished but would be delegated special functions with respect to raw materials and new raw material capacity.

The plan makes four groups directly responsible to the War Scheduling Board, or WSB, and details the part each is to play in obtaining balanced production and material distribution. The groups are WPB, war agencies, raw material producers and the prime contractors. Trade associations, to furnish statistical data on raw material supply, and subcontractors to submit product schedule requirements, also figure in the plan.

Under the plan raw material is defined as:

"The commercial state of each basic material which lends itself to reduction to the form required for fabrication into the full range of products requiring its use."

Roughly, WSB would find what monthly material supply is, what strategic need is and how production schedules are progressing. On this basis WSB would tell each branch of the Army and Navy and the branches of other war agencies, how much material each can authorize to put in process according to the urgency of end-product need.

The Army or Navy then would approve production schedules which indicate material requirements and send the production schedules to the prime contractors. The approved production schedules would be warrants of authority granted by the government, empowering raw material producers to sell to prime contractors and subcontractors.

RAW material production statistics would be furnished by the raw material producers to trade associations. The trade associations would collect and transmit the data to WPB which in turn would direct it in suitable form to WSB. Prime contractors would submit raw material requirements by products showing production schedules including a summary of all sub-contractors' requirements and schedules. Critical material requirements also would be sent.

The contracting agency would give to WSB a monthly desired delivery schedule for the end products requiring each raw material, based on the requirements of the overall military program. Each delivery schedule would be accompanied by a material requirements schedule showing by months the gross weight including rejections of the raw material required to carry out the schedule. The inventory of both the prime contractor and subcontractor would be asked.

WSB's allowances to the armed services and other agencies would be on a monthly basis, definite for three months, and tentative for six additional months, with a percentage of each definite allotment withheld as a reserve for schedule adjustment. The armed services would grant material through approved production schedules to prime contractors on the same basis. Prime contractors then would negotiate for three months' supply of raw materials for themselves and through the sub-contractors for their portion.

THE raw material producers through their trade associations, and under supervision of WPB would assume responsibility for correcting any unbalance which may result from prime and sub-contractor orders to their regular sources causing one raw material producer to have orders in excess of available capacity while others have capacity in excess of orders received. WPB would be given the job of policing for WSB the production allocation between raw material producers and the shipments by these producers to conform to approved production schedules.

General Motors says in justifying the creating of WSB, that centralization of control is only required on the policy decisions dictated by strategy pertaining to distribution of material to national and international industry under the conditions of demand in excess of supply. The corporation points out that decentralization of the details of execution of policy decisions can best be carried out by experienced agencies, the war agencies.

One advantage claimed for the plan is that it provides for continuous information on strategic needs in the form of product schedules, continuously adjusted information of the critical material require-

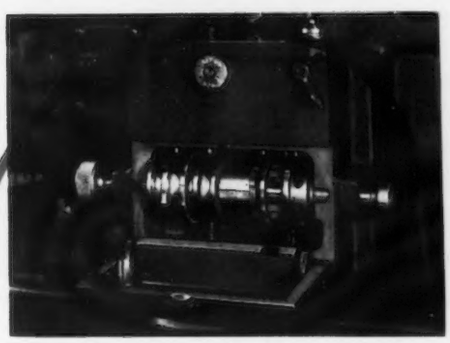
*Wide-World*

**NEW BRITISH AIR PARTS CHIEF: E. R. Fraser, London, will now be responsible to the British Air Ministry for all aircraft parts delivery except engines, propellers and radios in his new capacity as Director General of Equipment to Britain's Ministry of Aircraft Production.**

CINCINNATI

# You Don't Need a Toolmaker

## TO RUN AN O-8 MILLER



*Above:* Boss of the feed cycles. Cycle selectors may be changed in a minute or two.

*Right:* CINCINNATI No. O-8 Plain Automatic Milling Machine with automatic rise and fall spindle carrier.

When you find it difficult to hire toolmakers and first class machine operators, then you appreciate machine tools having that intangible quality "built in skill", coupled with as many automatic features as compatible with your production requirements. These two factors—both of which are prominent in CINCINNATI O-8 Millers—go a long way towards keeping your assembly line running smoothly.

In the illustration above, the operator is milling screw driver slots in small screws. There are only two things for him to do—load the fixture and flip the starting lever (clamping, unclamping, and ejecting are automatic with the movement of the table).

*The machine automatically goes through the cutting cycle, and returns the table to the starting point. The complete cycle requires only .08 minutes, hourly production depending largely upon the dexterity of the operator in loading the fixture.*

This machine is not a single purpose installation—far from it. By merely changing the cycle selector (a matter of a minute or two), almost any conceivable feed cycle can be obtained.

Write for catalog M-828. It contains the complete description and specifications for CINCINNATI No. O-8 Plain Automatic Milling Machines.

THE CINCINNATI MILLING MACHINE CO. CINCINNATI, OHIO, U.S.A.

TOOL ROOM AND MANUFACTURING MILLING MACHINES . . . SURFACE BROACHING MACHINES . . . DIE SINKING MACHINES

ments of these product schedules, and continuously revised information on critical material availability.

WAR product schedules, it was pointed out, will change in type and quantity with shifts of military and strategic needs. The critical material requirements of these schedules will change from the above causes plus the effect of material conservation and substitution.

"Critical material availability will change through increase of production capacity, or its decrease by enemy action or other causes," says GM. "Continuous review of all these factors and periodic adjustment of schedules are obvious necessities."

Prime contractors would be in a sense little "WPB's" by themselves. The authority that would be given them, it is claimed, for the acquisition of critical raw material, would provide for the needed decentralization of administration of distribution of the critical raw material to subcontractors.

According to GM, prime contractors are best fitted to supply to the services accurate information on the raw material requirements of each product in the form of per unit requirement for all materials and the desired monthly schedule requirements for each raw material designated as controllingly critical by WSB. This delegation of authority, it is said, relieves the services of all details except that of consolidation by each branch of its total program product schedule requirements for the critical material.

WSB if set up should be a "small, compact, experienced group comprising one advisory representative from each agency, Army, Navy, WPB, Lend-Lease, etc., interested in the distribution of critical material, and should be headed by an executive whose decisions shall be final."

Other related programs are under consideration by WPB as substitutes for the priority system. The Contract Production Control Plan described in THE IRON AGE, Aug. 13, page 98, is considered most likely to succeed by a large number of war agency officials. Nevertheless, the GM Plan has its proponents who insist on its adoption.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

JUST A SECOND, PHOTOGRAPHER, TILL I FIX MY HAIR -- WHAT WAS THAT YOU ASKED? OH, YES-- NO---
THAT'S A COMBINATION THAT WOULD SCARE ME TO DEATH -- A WRITER AND A PHOTOGRAPHER! THEY BOTH KETCH YOU WITH YOUR MOUTH OPEN TOO WIDE, TH' PICTURES SHOT AN' TH' STORY WROTE! WOT ARE THEY GETTIN' READY FOR?
WAIT'LL THEY SEE THAT IN PRINT! IT KINDA TICKLES ME -- THEY USED TO TRY TO KETCH US GUYS CLEANIN' UP BEFORE QUITTIN' TIME -- NOW THEY DON'T GET A CHANCE!
J.R.WILLIAMS
8-28
COPR. 1942 BY NEA SERVICE, INC.
THEIR OWN MEDICINE

## WPB Makes Appeal for Equipment of Standard Design

*Washington*

• • • **WPB has appealed** to all contractors in the fields of power plant construction and oil refinery and synthetic rubber plant construction to use, insofar as possible, only equipment of standard design.

Howard Coonley, chief, simplification branch, conservation division, in letters to designers and constructors of power plants, oil refineries and synthetic rubber plants, pointed out that almost all materials used in this construction are on the critical list.

"A preliminary survey indicates that the inclusion in such installations of special designs will substantially retard production in bottleneck industries," Mr. Coonley stated.

"The war effort may compel the government to prohibit the production of 'specials'. Before this happens, I am writing to all known contractors in the field, as well as to corporations doing their own designing and erection work, to request that hereafter, insofar as possible, only equipment of standard design be used."

## More July Strikes; Fewer Man-Days Lost

*Washington*

• • • **The War Labor Board** reports that new strikes were up slightly in July to 198 compared with 171 in June. The number of men involved likewise fell from 78,627 in June to 74,812 in July. Translated to man-days the July loss was 233,614 against 254,653 man-days in June.

## Republic Declares Dividend

*Cleveland*

• • • **Republic Steel Corp.** has declared a dividend of $1.50 per share on the 6 per cent cumulative convertible prior preference stock, series A, and a dividend of $1.50 per share on the 6 per cent cumulative convertible preferred stock, payable Oct. 1, 1942, to stockholders of record Sept. 9, 1942.

A dividend of 25 cents per share was also declared on the common stock, payable Oct. 2, 1942, to stockholders of record Sept. 9, 1942.

# 5 Ways to Get Faster Deliveries of *Special* Carboloy Tools and Blanks

A "special" Carboloy tool or blank is one made to special shape, size, tolerance or grade. Any one or all of these requirements—means a "special". It requires special handling apart from our regular production line of standards. To help you get essential specials with a minimum of delay and expense, we list below 5 suggestions to follow when ordering.

BUT—before you order—check your needs against Carboloy Standard Tools & Blanks. Produced and placed in stock by the thousands daily, Carboloy Standards are suitable "as is"—or adaptable by grinding—to 80% of all turning, boring, facing jobs. In this crucial period when every minute counts, you can usually save 6 to 8 weeks delivery by ordering standards instead of specials whenever possible.

### FIVE POINTS TO CHECK WHEN ORDERING "SPECIALS"

**1. Follow these suggestions when specifying tolerances—**

(a) Be *sure* your tolerances are as liberal as job will permit.

(b) Specify tolerances on all decimal dimensions.

(c) Use our standard tolerances whenever possible. These are:

### STANDARD TOLERANCES

**TOOLS**

| Shank Width and Height | Finished Tools | Milled and Brazed Tools |
|---|---|---|
| 1" and less | +.000; −.010 | +.000; −.015 |
| Over 1" | +.000; −.015 | +.000; −.015 |
| **Shank Length:** | | |
| 4½" and less | + 1/16; − 1/16 | |
| 4⅝" to 7½" | + 1/8; − 1/8 | |
| Over 7½" | + 1/4; − 1/4 | |

**BLANKS**

| Blank Dimensions | Tolerance |
|---|---|
| Up to ⅜" | +.015; −.000 |
| ⅜" to 1" | +.020; −.000 |
| 1" to 2" | +.040; −.000 |
| 2" to 3" | +.060; −.000 |
| 3" to 4" | +.080; −.000 |
| 4" to 6" | +.100; −.000 |
| Over 6" | +.125; −.000 |

**2. Specify the following stock sizes of shank steels:**

| | | | | |
|---|---|---|---|---|
| ¼" square | ⅝" square | ⅞" square | ⅝" x 1¼" | 1" x 1½" |
| 5/16" square | ½" x ¾" | ⅝" x 1" | ¾" x 1½" | 1¼" x 1½" |
| ⅜" square | ¾" square | ¾" x 1" | 1" x 1¼" | 1½" square |
| ½" square | ½" x 1" | 1" square | 1¼" square | 1½" x 2" |

**3. Design tools to use standard blanks. They are carried in stock.**

**4. Use the same standard relief and rake angles that we use on our standard tools. Our manufacturing facilities are set up to produce these angles rapidly. (Send for catalog GT-142.)**

**5. Furnish at least two (preferably three) sets of blueprints on all special orders. This eliminates delays for duplications of prints.**

The Mark of CARBOLOY

**CARBOLOY COMPANY, INC.**

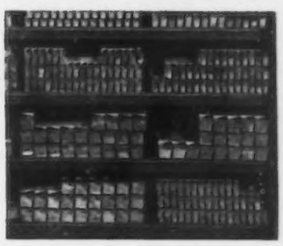
11153 E. 8 MILE BLVD., DETROIT, MICH.

Chicago • Cleveland • Los Angeles • Newark • Philadelphia • Pittsburgh

*Canadian Distributor:* Canadian General Electric Co., Ltd., Toronto, Canada

### *Order "Specials" When They Are Essential . . .*

**BUT . . . whenever possible use Carboloy STANDARD tools and blanks . . HERE'S WHY:**



Carboloy Standards are in "mass" production. Shipped from stock. No delays for drafting, quotations or special ordering. You save 6 to 8 weeks delivery time.

You can quickly and easily torch braze standard blanks to your steel shanks in your shop. . . . Tool up rush jobs *FAST!*

You can quickly grind standard tools to special shapes. Carboloy standards are adaptable to 80% of all turning, boring, facing jobs.

**CARBOLOY** CEMENTED TOOLS • DIES • DRESSERS CORE BITS • MASONRY DRILLS • WEAR RESISTANT PARTS • CARBIDES

FOR THE MANUFACTURING • MINING • TRANSPORTATION • CONSTRUCTION INDUSTRIES

# WEST COAST . . .

**• Women workers in aircraft plants increase steadily, take cuss and sweat jobs but leave heavy lifting to men . . . Half women workers at Vultee are married . . . Provide many headaches for unions.**

SAN FRANCISCO—Beneath the aura of perfume emanating from the dispatches of women journalists junketing through Coast war plants lie some good substantial reasons why the proportion of female workers has leaped in the past year.

Eighteen months ago the California aircraft industry employed less than 500 women. The preponderance of male workers, however, were well within the selective service bracket with the median age well under 30 years. Although there was a leavening of skilled older workers and engineers, the industry, because of its own youthfulness, had attracted workers that were receptive to training in new methods, unorthodox and experimental techniques. That's one reason why there were so many youngsters. Another reason was the large number of semi-skilled job classifications in proportion to the totals. Older, stronger workers were drawn to the better paying shipyards.

When draft boards began to become restless, and the handwriting on the wall said that indefinite deferments could not be granted even to workers in essential industries, aircraft personnel managers had little choice as to whether or not they would ask the girls to come to the plane plants. No other labor reservoir was adequate to fill the demand.

For a while some companies kidded themselves that they were hiring women because of greater ability in manual skills requiring dexterity, but it has gradually become apparent that, inside the aircraft industry and out, women are able to handle some of the sweat and cuss jobs if not those actually in the groan and grunt classification. An early fear by union leaders that women workers would lower the general wage level has been almost completely dissipated.

SOME of the lady reporters who visited the Boeing plant last week eagerly seized upon a chance statement by H. O. West, vice-president, that women workers there were "creating a disturbance" and had gone to work for "other than serious purposes." Such an admission was like awarding an Army-Navy "E" to a certain segment of the women workers, and may prove the basis of a recruiting campaign among the weaker sex. Or it may have been good business for the sob sisters to represent industrial establishments as good matrimonial agencies. Such statistics as are available indicate that a far more sober purpose underlies the motives of a large proportion of the women factory hands. At Vultee, which is generally credited with having had more experience with women than the other heavy industrial plants, approximately one-half of the women are married and 68 per cent of those had children to support when the last tally was made. And Vultee further typifies the industry in its report that the number of men leaving the company payroll for military service has increased 75 per cent since Pearl Harbor.

Most aircraft employers frown upon women under 21 or 22. Boeing's Mr. West was quoted by the traveling lady reporters as looking forward to segregating as much as possible the women workers in subassembly, which constitutes a large portion of the operations of the Seattle plant. Vultee has already tried segregation, but Betty Cowork likes to have the men around. Production, a Vultee executive is quoted as saying, has been stimulated by competition between the sexes which all goes to prove that the basic idea of the Thurber school of thought is sound.

Statistically, the rate of growth of the female contingent in the aircraft industry has been phenomenal. Figures released by the California Division of Labor Statistics and Law Enforcement show that the aircraft industry in that State employed approximately 18,000 women as factory wage earners in June, 1942, compared with 12,000 in May and less than 500 in February, 1941. These figures compare with a total of 29,000 women employed in all California durable goods manufacturing industries in June and 22,000 in May. So far, most of the women factory workers are going into aircraft. The State CIO claims that 65,000 women will be employed by California aircraft plants by the end of this year but that figure seems excessive. Percentage wise, Boeing claims top honors with about 26 women out of every 100 workers. Vultee, at last report, had about 21 per cent. The ratio for the Coast plane industry as a whole is as closely guarded as America's secret bombsite, but probably lies somewhere between 12 and 15 per cent.

ORGANIZED labor has had as many headaches from the introduction of women as has management. First came the problem of seeing that wage levels were not depressed. Then came the discovery that the heavy industrial unions were short on lady organizers, complicated by the fact that female workers were reluctant to pay union dues inasmuch as they had entered industry at a time when prospective union benefits were at low ebb. Inasmuch as a cry has gone up that few plants have made provision for day nurseries for children of women workers, having other problems on their minds, the unions are devoting a great deal of attention to working out that difficulty. Now, it appears that the WPA has at last found at least a small niche in war work by inaugurating such a nursery program.

Around San Francisco Bay, where there are no major aircraft producers, and where shipbuilding counts for a huge employment volume, woman got her foot in the employment door through employment at the Mare Island Navy Yard. Because civil service obviated union membership difficulties, government establishments around the Bay have accounted for most of the women employees up to the present time,

# Supporting the Home Front's Production

# FOSDICK H. S. DRILLS

● New designs in tools, jigs, fixtures are constantly being developed to improve and increase production of vital material for War.

Tool and Die Shops throughout the Nation are working 24 hours a day to speed improved tooling methods to production plants.

Fosdick H.S. Drills are being used by the hundreds to speed these new tools to the various shops.

Illustrated is Fosdick High Speed Drill in a mid-west tool shop where it performs drilling, reaming, boring and facing operations on a wide range of work.

With a single speed motor 6 and 9 speeds are obtained; and with a two-speed motor, 12 and 18 speeds are obtained. Capacity up to 1¼".

For speed, accuracy and high production use. Fosdick H.S. Drills.

Complete details will be found in the Fosdick Bulletin H.S.A. Write for it.

**FOSDICK MACHINE TOOL COMPANY**
CINCINNATI ••• OHIO

with probably 3000 working at Mare Island alone. Women have been frowned upon by the AFL Shipyard Craft Unions around the Bay generally, but one AFL group, the production machine operators and miscellaneous metal workers Local No. 1237 has 700 women members out of a total of 3500. This union has contracts with 119 Bay Region plants, and admits any woman to membership who has a job at one of these plants or who has sufficient skill to get a job. A woman is allowed to work 30 days at a plant at which the union is bargaining agent before she is required to join. Equal wages for equal work is the general rule, but where heavy lifting is required women take 10 per cent less wages and let the men do the lifting.

San Francisco public industrial schools now have classes open to women in welding, shipfitting, marine drafting, sheet metal work, aircraft sheet metal work, and machine shop practice.

Two of the Bay Region's major shipyards, Western Pipe & Steel Co. and Bethlehem, have not yet begun to hire women because of lack of facilities. But the yards of Moore Drydock Co., the Kaiser interests, and W. A. Bechtel Co. have small numbers of women working as welders and burners. At Portland, Oregon Shipbuilding Corp., the Kaiser unit which broke all records last week by launching a hull in 34 days, employs about 400 women. Of these, about 300, newly trained, are welders, and the balance warehouse workers.

Besides having to provide separate sanitary, rest, and locker facilities, California employers have had to overcome certain restrictive legislation, particularly one law which militated against the employment of women on the graveyard shift.

Thoroughly husked, the problem is well summarized by Jack Frost, executive secretary of the Aircraft Parts Manufacturers' Association: "Labor supply is becoming increasingly difficult. We are employing more and more women in certain jobs. However, in spite of the fact that the employment of women makes sensational publicity for those who are publicity inclined, there are still many jobs in which women cannot be employed and many companies are unable through a number of circumstances to convert their shops for women."

THE Aircraft Parts Manufacturers' Association, through Mr. Frost, last week added itself to the group going on record against the proposed excess profits tax on the ground that the tax would discourage production. Most aircraft parts manufacturers have entered the industrial field too late to take advantage of the 1936-1939 base period for calculating normal earnings, above which the excess profits tax applies. Mr. Frost estimates that not more than 5 per cent of the association members could take advantage of the base period option to determine their exemption. Consequently, they will be forced to calculate their excess profits as those exceeding 8 per cent of capital investment. Inasmuch as many of these firms have a comparatively modest capital — the prime aircraft manufacturers usually furnish them material and the parts people supply only labor, machines and management—their profit is dependent upon volume. Thus, if the proposed excess profits tax law is passed, they claim that there will be little incentive to push production past the initial period sufficient to roll up the allowed profit.

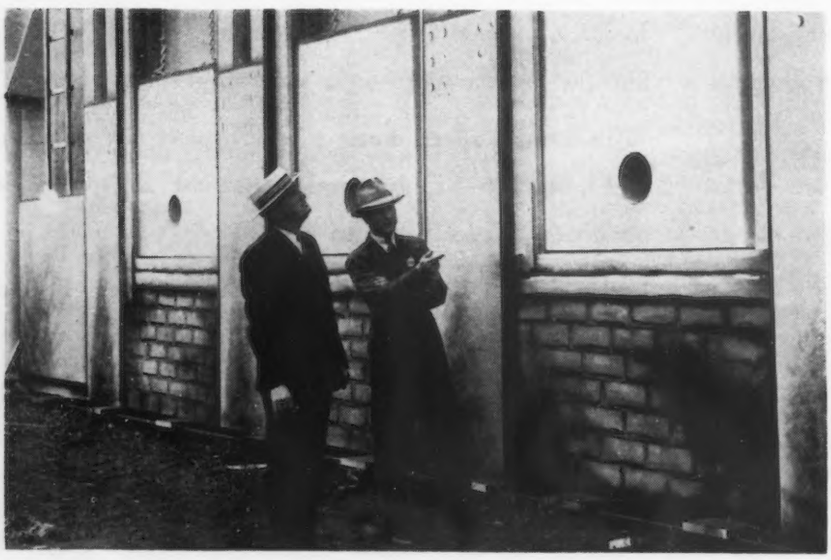
Because the large proportion of their costs are labor, the aircraft parts manufacturers in many classifications are hard hit by OPA ceiling price regulation as wage scales mount.

CIO workers at the Vernon (Los Angeles) plant of the Aluminum Co. of America walked out last Friday in a "grievance strike" which union officials said was unauthorized. The pretext for the walkout was the alleged discharge of 30 skilled workers for protesting dismissal of another employee, but there has been a basic dissatisfaction over wage standards in the non-ferrous metal industry in the area.

Again the seemingly perpetual inter union struggle involving welders raised its head when 6000 welders at the Kaiser yards in Richmond were asked by the executive board of their local to quit their jobs on an "individual and voluntary basis," to register their disapproval of the formation of a rival AFL local. This is apparently no "beef," but a jurisdictional jealousy involving two rival local groups of boilermakers and their International headquarters.

**STAGECRAFT FURNACES: Several new open hearth furnaces built by Carnegie-Illinois at Gary will not be able to go into production. They were built of cardboard and Masonite for stage scenery in an employee-staged part of the Chicago Music Festival.**

*Acme Photo*



## New Date for Safety Congress

• • • **The date** and location of the National Safety Congress and Exposition have been changed because the Army Air Corps has taken over the Stevens and Congress hotels in Chicago where the meeting was originally scheduled. A new date has been set for the three-day congress. It will start on Oct. 27, and will be housed in Chicago's Sherman, La Salle and Morrison hotels. Headquarters will be in the Sherman.

PORTER
ARMY
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NAVY
H. K. Porter Co., Inc., was one of the first companies to receive the Army-Navy Award for high achievement in production.
LOCOMOTIVES AND
PROCESS EQUIPMENT
H. K. PORTER COMPANY, INC.
PITTSBURGH . . . . PENNSYLVANIA

# Fatigue Cracks BY A. H. DIX

### "I Tell You How I'd Do It"

• • • This acid drop of wisdom is siphoned from *"Ad-Munitions,"* a bulletin written by Carr Liggett, Cleveland advertising agent:

> Though the Gallup polls have lately begun to record an increasing degree of modesty among the interviewed, so that sometimes there are as many as ten per cent who realize that it is ridiculous to form a positive opinion on a subject upon which they know nothing, it is too soon to assume real progress.

And what is more, the very man who knows just when and where the second front should begin, how Leon Henderson should run the OPA, and what infield changes would have enabled the St. Louis Cardinals to overtake the Dodgers, immediately becomes reserved in his statements when you ask him something about his own business. He won't hesitate to say, *"Well, there are so many things to be considered, and so many unknown factors, that I wouldn't want to make a definite statement."*

We suppose the habit of making dogmatic assertions on subjects of which the speaker knows little is simply another way of escaping reality. The business of living presents the individual with a continual flow of problems concerning his own affairs—handling his own job, raising his family, whether or not to have Junior's teeth straightened, and so on. Frequently he has the uncomfortable feeling that his batting average in solving those problems is not as high as it should be. The more acute that feeling the greater the need for an escape to the realm of cosmic problems where his judgments will never be put to actual test.

After revealing where the British made their big mistakes, what the Russians should do next, and what Donald Nelson should do to balance national inventories, he is mentally refreshed and ready to return to the problem of deciding whether '43's income taxes will allow Mildred to have another year at State U., or whether she should take a job in a munitions plant and start kicking into the family exchequer.

### Joe Doakes and the Senator

• • • Little harm is done when J. Wilbur Doakes sounds off between bridge hands on the 8:20 express from Wilmette. His friends have heard Wilbur before. But some damage might be done were Wilbur to break into print, where his views could influence people unacquainted with Wilbur's limitations.

For that reason we think that our public servants should set Wilbur a good example by subjecting their balloons to the test of cold fact, even at the risk of deflating pinpricks, before exposing them to public view. But in some quarters it seems to be regarded as unsporting, even unethical, to ask for advice from someone with knowledge of the subject discussed. As instance, we have the example of such an able legislator as Senator O'Mahoney staining his reputation for sound thinking by mouthing asininities concerning sponge iron, when a telephone call to any one of a number of Washington bureaus would set him right.

### Safe on Their Pedestals

• • • A little checking in the right places would also have spared this page its recent frothing at the mouth in favor of melting up our nation's heroes to help relieve the copper shortage. Edwin C. Barringer, president of the Institute of Scrap Iron & Steel, says:

> Statues are principally cast from nonferrous metal alloys, in many forms of which there is now actually a surplus. Many dealers are unable to market certain grades of copper-base alloys . . . one reason being that specifications for much war work permit the use of virgin metal only.

### Scrap Wardens

Having burned our fingers, we offer our next suggestion trepidly, in a whisper, and wtih apologies if those who are studying scrap collection methods have already thought of it. Our brain child is this:

> In our backyard is a basket in which we have deposited an enema bag that leaks, a pair of worn-out rubbers, a rubber heel, and a torn shower curtain. Our hoard is too small to be dignified by a trip to our neighborhood gasoline station. Under the back porch we have collected about 20 lb. of scrap iron and steel. There is some more in the back lots. About a month ago the local fire truck picked up what we had saved up to that time, but no one has called since.
>
> The most successful war measure in our town is the system of having an air warden to every block. The job of being a block scrap warden would not be nearly so romantic as being an air warden, but it might be even more useful.
>
> We doubt that spasmodic scrap drives will work out. What is needed is a week in and week out collection system under the eye of a warden who knows every family on the block.

### Sheet Melter

> A heavy bomb also hit the sheet melting mill of the Thyssen works . . .
>
> —*New York Times*

Just missing the scrap rolling mill.

### Aptronym

• • • A York, Pa., meat market is conducted by Hamburger Bros.

### Johnny-Come-Lately

> It is strange that no one has proposed taking up streetcar rails . . . to add to our scrap heap.
>
> —*A. M. S. in a letter to the editor of the New York Herald-Tribune*

And where have *you* been keeping yourself?

### Puzzles

Lt. Com. A. R. Simpson's answer to the tough Aug. 13 milk and water problem is 11 min. 33 sec. Lane (Montgomery Ward) Ladd makes it 11 min. 38 sec. Both are close enough to G.M.R.'s answer of 11 min. 40 sec. to satisfy us, so an A to all three.

As you saw at a glance, the answer to last week's trifle was 3 seconds.

The Lt. Com. is responsible for this cerebrum-kinker:

*The rubber in an inner-tube weighs 3 lb. Assume that the inner and outer peripheries of the tube are circles, that a right section of the tube is a circle, that the rubber wall is of uniform thickness, and that the specific gravity of the tube is 1.2.*

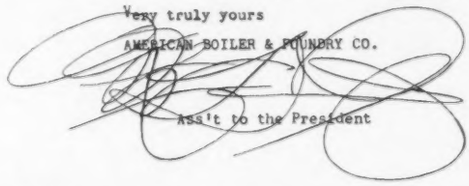
*If the diameter of the inner periphery is 16½ in. and the diameter of the tube (measured from outside surface) is 5¼ in., find the thickness of the rubber wall of the tube.*

### Stopper

• • • 28 Tons Sitting on Nothing—*Foote Bros. Gear and Machine Corp,*

### Jackpot

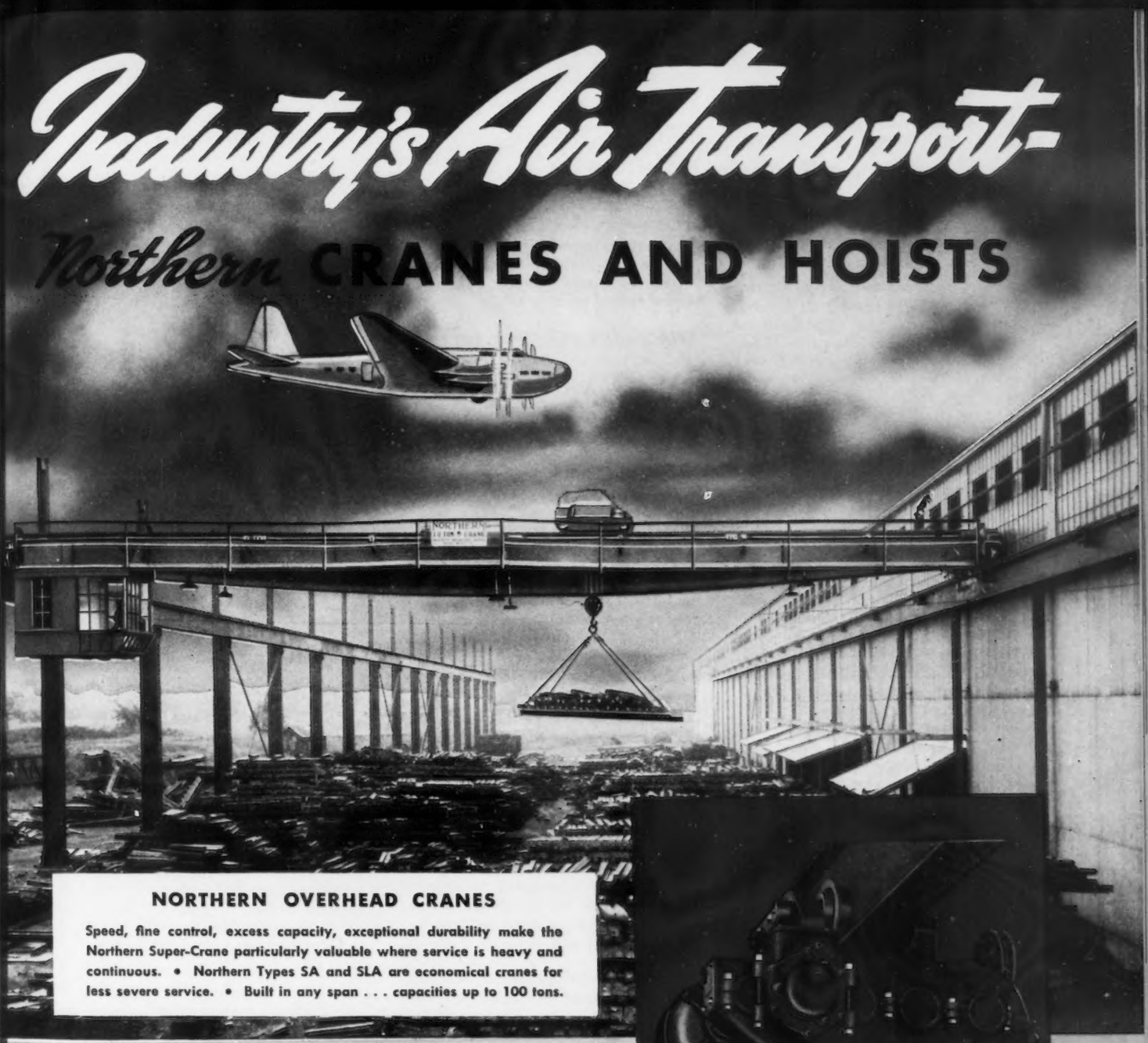
> The signature of Mr. Harry Denham, Assistant to President F. E. Ross, of the American Boiler & Foundry Co., Milan, Mich., has always intrigued us here. We think it is just as illegible and much more interesting than some of the signatures that you have been publishing recently. Do you not agree?
>
> —*B. A. Nagelvoort, President. Renown Stove Co., Owosso, Mich.*




We do indeed agree. Mr. Denham has achieved absolute illegibility. We will play him against the best in this or any other field.

# Industry's Air Transport—

## Northern CRANES AND HOISTS



### NORTHERN OVERHEAD CRANES

**Speed, fine control, excess capacity, exceptional durability make the Northern Super-Crane particularly valuable where service is heavy and continuous. • Northern Types SA and SLA are economical cranes for less severe service. • Built in any span . . . capacities up to 100 tons.**

The Army and Navy are discovering what industry has known for years—that materials may be moved through the air with ease and dispatch. There is much news of development of air transport.

The fighting forces have to do it with planes—but industry moves materials through the air with reliable Cranes and Hoists. Speed and safety are easily obtained and clear pathways are always available even in shops jammed with work.

Northern Cranes and Hi-Lift Hoists have, in the past decades, contributed much to industry's air transport. They are contributing much more in this heavy load of war work.

### NORTHERN HI-LIFT HOISTS

**Provide maximum hook lift to make better use of headroom. Like Northern Cranes these hoists are built with machine-cut, heat treated steel gears—turned and ground steel shafts—ample size roller bearings. Frames are one piece welded steel construction and the upper half of the gear case is easily removed so the entire assembly is accessible. • Wearing surfaces of the mechanical load brake easily replaced without removing gear case.**

## NORTHERN ENGINEERING WORKS

*General Office:* **2707 Atwater St., DETROIT, MICH.**

**NORTHERN CRANE & HOIST WORKS, Limited • WINDSOR, CANADA**

*Offices at*—913 South 38th St., BIRMINGHAM • 53 West Jackson Blvd., CHICAGO • 2428 Spring Grove, CINCINNATI • 5724 Navigation Blvd., HOUSTON • 44 Whitehall St., NEW YORK 555 Union Trust Bldg., PITTSBURGH • 4135 Gratiot Ave., ST. LOUIS • 1679 University Ave., ST. PAUL

# Dear Editor:

## BAD REPORTING

Sir:

In the Aug. 13 issue, page 74, appears a story on expansion of the National Emergency Steel classifications. The Technical Committee on Alloy Steel of the American Iron and Steel Institute developed the new 9400 series Emergency Steels at the request of H. J. French of the WPB. The work was done 100 per cent by our committee, under the chairmanship of John Mitchell of Carnegie-Illinois Steel Corp. In less than two weeks, 46 experimental heats of steel were made, forged down to test sizes, and Jominy hardenability tests were run. The data were correlated and the program presented to WPB by the committee. Many heats of those steels are now in production. Several will be used by the automotive industry and several others in the manufacture of tanks.

Mr. Lippert secured the lists which appear on page 74, from Mr. Mitchell. As a matter of fact, Mr. Lippert was sitting in Mr. Mitchell's office and overheard two conversations between Mitchell and me on the progress and status of this work. The following Monday morning the information was released for publication to Mr. Lippert for THE IRON AGE. Under the circumstances, I feel that Mr. Lippert's failure to mention the Technical Committee on Alloy Steel of American Iron and Steel Institute, or even mention the Institute as such, is certainly an example of bad reporting.

This is not the first instance where the Institute's work has been published by THE IRON AGE without due credit. We are not seeking over-credit in any instance, but we do feel that when the members of our committee devote so much time and energy to the metallurgical needs of the country, they should be given credit for the work they do.

*CHARLES M. PARKER,*
*General Technical Committee,*
*American Iron and Steel Institute*

**• Sorry. Full credit should have been given the Institute for excellent execution of a difficult job.—Ed.**

## LIBRARY CLIPPINGS

Sir:

We have an idea of establishing a library of material of particular interest to our salesmen and customers, but we do not desire to keep the entire magazines in our file. Will you kindly tell us how we can get extra pages in various quantities?

*FREDERICK BODY,*
*C. W. Marwedel,*
*San Francisco*

**• If you want a half-dozen clippings, let us know and we'll see if we can get them for you. If you want 25 or more, the best thing would be to have offset reprints made. Since THE IRON AGE is copyrighted, please write us whenever you want a quantity of extra copies made.—Ed.**

## SHELL WASHING, DEGREASING

Sir:

Referring to "Turning out 37-Mm Shells on Automatics," in the July 9 issue, will you be kind enough to furnish us any information you may have as to what compound is used for washing the shells, leaving an oil film to prevent rust; also what compound do you use for degreasing?

*S. T. FALK,*
*Aircraft, Inc.,*
*Santa Monica, Cal.*

**• The material used in washing the shells is Quaker 190-X Compound, made by the Quaker Chemical Products Co., Conshohocken, Pa. Blaco Solvent is the degreasing compound, made by G. S. Blakeslee & Co., 19th & 52nd St., Cicero, Ill.—Ed.**

## LODGE & DAVIS PARTS

Sir:

I notice in your Aug. 13 issue that Carl A. Miller wants to know where he can get parts for an old Lodge & Davis turret lathe. Years ago, when I was in the employ of the American Tool Works Co., Cincinnati, we frequently wrote repair orders for replacement parts applying to old machines as made by the Lodge Barker Co., Lodge & Davis Machine Tool Co., and Davis & Egan Machine Tool Co.

So you will see that the American Tool Works Co. succeeded to the business of all three of these firms of earlier vintage.

*C. K. CAIRNS,*
*Cincinnati, Ohio*

## COLLECTIVE BARGAINING BOOK

Sir:

Would you kindly let me know where I can secure a copy of a recent publication known as 20th Century Fund's "How Collective Bargaining Works," and the price of same.

*C. SHAW,*
*Canadian Manufacturers Association,*
*Toronto, Ontario*

**• Write to Twentieth Century Fund, 330 W. 42 St., New York. Price of "How Collective Bargaining Works," 1000-page book, is $4.—Ed.**

## GERMAN STEEL

Sir:

I saw in "Dear Editor" of Aug. 13th issue that photostats were available regarding latest German steel specifications. I will be grateful if you can send me a copy of these specifications.

*R. L. FARABAUGH,*
*Metallurgist,*
*Barium Stainless Steel Corp.,*
*Canton, Ohio*

**• Write to Wolf Flatow, 438 S. Coeur D'Alene St., Spokane, Wash. Mr. Flatow has the DIN specifications up to and including 1940 and will doubtless be good enough to supply photostats at cost.—Ed.**

## WHAT IS IT?

Sir:

The controversy on "Sponge Iron" is interesting, but what is it? Have asked several experts and I have as many descriptions.

*LOUIS W. COLE,*
*Cole Electric Products Co., Inc.,*
*Long Island City, N. Y.*

**• Iron in a porous form, obtained by reduction without fusion.—Ed.**

## SCRAP FROM SLAG

Sir:

Will you please advise where I can secure some data on the reclamation of steel scrap from slag. I understand this operation is being performed at many of our steel mills.

*R. DENOCELLE,*
*Scott Steel Co.,*
*Chicago*

**• An article on this subject appeared in our Jan. 1, 1942, issue.—Ed.**

## BRIGHT STEEL

Sir:

CAN YOU ADVISE SOURCE ON BRIGHT STEEL USED FOR MAKING PUNCHES AND DIES? CANNOT FIND IT IN YOUR DIRECTORY.

*A. F. RIECKEN,*
*Sunbeam Electric Co.,*
*Evansville, Ind.*

**• Bright steel completely unknown to us and to several large producers of die steel.—Ed.**

## MAGNAFLUX

Sir:

If reprints of your two articles "Magnafluxing Inspection" are available, we would appreciate having one or more copies.

*EDWARD FLUG,*
*Engineering Department,*
*Simmons Company,*
*Kenosha, Wis.*

## POWDER METALLURGY

Sir:

In the July 23 issue of THE IRON AGE, we note that you have published a booklet on powder metallurgy which is available at 25c. per copy. It would be appreciated if you would send a copy to this office.

*ROBERT HOFSTETTER,*
*Chief Engineer,*
*Federal Prison Industries, Inc.,*
*Washington*

## AIRCRAFT STEEL SPECIFICATIONS

Sir:

I shall be grateful if you will supply me with a copy of the article "U. S. Government Specifications for Aircraft Steels," as compiled by the Carnegie-Illinois Steel Corp. I will remit you the cost and postage on receipt of your invoice.

*K. W. WALPOLE,*
*Liverpool, England*

**• Mailed. No charge.—Ed.**

TWO PLANTS converting to war production were buying new lathes. One wanted 25 Monarchs, the other, 18.

But—other plants needed new lathes, too. Needed them badly. Decreasing these two orders would not only permit faster delivery, but would save lathes for other users.

Our technical field men studied production methods and schedules. They found that by taking full advantage of Monarch's wide utility and timesaving features, 18 lathes would do the work in one plant, and 10 in the other. Result—15 Monarchs made available for other producers.

Such incidents are common in the work of Monarch Engineers. They know that Monarchs can do more work than is usually set up for them . . . that Monarchs' power and rigidity enable them to take the severe service demanded today, without flinching, with no letdown in dependability and accuracy.

Even with 1942 production twice that of 1941, and four times that of 1940, Monarch lathes continue to maintain their unvarying quality.

THE MONARCH MACHINE TOOL CO. • • • SIDNEY • OHIO

MONARCH LATHES

COVER THE TURNING FIELD

# This Industrial Week . . .

- **Scrap Shortage Now Major Problem**
- **Improvement Due in Distribution**
- **Some Priorities Inflation Still Present**
- **Labor Shortages Threaten War Output**
- **Steel Orders Remain Heavy**

EVEN though there are still such major problems as scrap shortages, inflation of high priority ratings and still a general failure on the part of some government heads to see clearly the distribution requirements of the war effort, there have been definite mileposts of overall progress in the past few weeks. For one thing, reports from important steel centers where operators are preparing to go to Washington this week to set up September quotas on various steel products, are optimistic that this directive plan is working so well that it should be retained for the duration. At the same time similar action has been taken on the distribution of steel products, thus dovetailing the two. If this latter step is taken in the same cooperative spirit, the WPB and the steel industry may have then reached the point where "all that can be expected" is being done with the steel made and shipped.

The improvement in shuffling the nation's steel and other metals into channels where it will do the most good, at the right time, would leave more energy for taking out some of the minor wrinkles that have a habit of becoming full grown bottlenecks if not carefully watched. Such a case in point is the lack of steel bars throughout the country's plants. Bar production this month has not anywhere near met the demands of war plants. Some of this condition has been due to extra heavy lend-lease requirements which, it is rumored, will be cut some in order to relieve this situation. On the other hand, steel operators believe that when September quotas for steel products are set up some steel will be siphoned off from less urgent items of steel bars.

•

AUTHORITIES point out, however, that once some of the latest WPB moves have been working successfully, industry should not be surprised by additional action which throws added burdens on the country's operators. It is being urged in high and low places that with so many changes made since the war started, a period of consolidation or review of past performance should take the place of trial and error moves. That this line of thought is making its appearance in Washington seems to be evidenced by the substantial drop in the number of priority and price changes made in the past few weeks. Whether this is significant to the extent that it may be the trend in the future remains to be seen.

Nevertheless the past two weeks have been marked by a relative quiet in WPB rulings. Only a few priority regulations in the metal working field were issued and a handful revised. Some observers think that this lull in procedural action is the forerunner of shakeups in the WPB but it might just as well mean the entering into a period of trial "before" error.

Whatever happens, industry can well look forward to changes which mean more bookkeeping and new rules, but it is thought that these changes will come less often and more effort will be made to find out whether some changes are actually needed instead of plunging into a new set of signals which in the past has hampered war output. For one thing, the PRP is now being revised to bridge the gap between the old priority system and outright allocation.

*See page 109 for news on new PRP revision.*

•

WHEN PRP came in, the Allocation Classification system was its bookkeeping adjunct. Then WPB found that ACS did not give enough information. There was no distinction between metals consumed for war production and those going into capital equipment, construction and operating supplies. The Production Code originally scheduled to go into operation Aug. 31 and detailed prior to that date to New York industrialists was held up for revisions and some circles are hoping that the holdup may have been induced by the desire to keep bookkeeping and form writing to a minimum. Thus will come, perhaps, the closer scrutiny of new orders and regulations as to their effect on actual production instead of the prime attention being placed on the theoretical side. Such a change for the good in promulgation of WPB rules would mean a drop in the number of costly revisions, paper work, and rechecking of industrial plant records and purchasing orders.

•

HOWEVER, while gains are being made along the production and distribution front, there are still "hard nuts to crack" on the scrap and manpower sidelines. Nothing proves the gravity of the scrap situation more than an analysis of July steel ouput figures. The rate was at 94.5 per cent of the new rated capacity figures. Yet had the scrap or other metallics been available at least 500,000 tons more steel could have been produced. For months and months the steel industry has operated below its full rated capacity. Given sufficient raw materials, the country's mills should, at least for several months, have attained 102.5 per cent of rated capacity or higher. On that basis the inability of the industry to reach its maximum rated output spells the loss of sorely needed steel at a time when such loss can be least afforded.

Nor is there much evidence at present that the steel rate may not be seriously curtailed before winter sets in. Some areas report scrap drives making some progress but the bulk of the reports indicate that the house-to-house and farm-to-farm drives are somewhat behind expectations. Such expectations, however, were not those of experienced scrap and steel men but came from sources which did not, earlier this year, realize to the fullest extent just how serious the picture was. Now that the plight of the steel mills is being admitted in all quarters, efforts are being made to meet the problem more realistically.

•

FROM reliable sources, THE IRON AGE is told that a strong movement is underfoot to bring scrap from Great Britain where supplies are said to be comfortable for practically all mills there. The vast amount of Lend-Lease activity has sent abroad hundreds of thousands of tons of "home" scrap which has made a dent in United States supplies. Now it appears that there is a good chance that soon the scrap movement will be reversed and Britain, which for years imported scrap, will be helping out in the United Nations' war effort by sending scrap back to this country as ballast for its ships.

*See page 92 for news on plan for scrap from England*

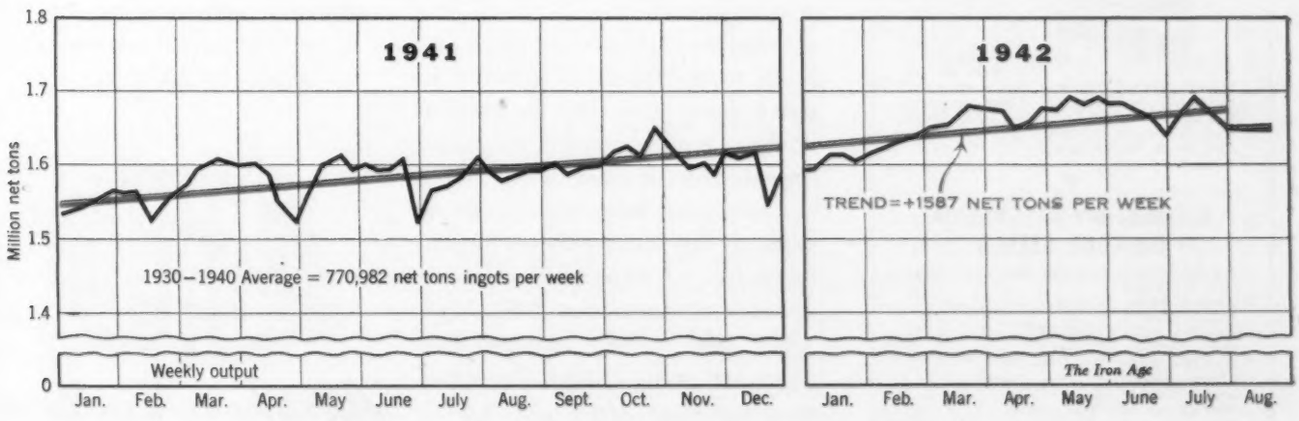
The newly Formed Waste Material, Inc., which is slated to buy up about 5,000,000 tons of scrap that cannot be reached because of price ceilings and because of the dismantling expense involved, has its job cut out for it. But observers claim that little time can be wasted if the operating rates of the country are not to begin sliding downward when it is of prime importance to keep them going up. Many steel mills in the country are on meager rations of scrap and many more are operating from hand-to-mouth. Furthermore, the quality of scrap, as has been pointed out before, has not improved and hence net output per furnace is down. Again too, it is noticed that while efforts are being made to get new blast furnaces into production, there are a number that have gone down recently for repairs.

BECOMING more serious each week in the metal working industry is the man power question along with efforts to build up an army of 7,000,000 men or more. The impact on industry is far more disquieting than is generally comprehended, according to surveys made by THE IRON AGE. Many machines stand idle in new plants or are operated only part time for the lack of trained men. Many of the apprentices who were trained to take the place of older men are now being drafted into the Army and high pressure recruiting methods of the Navy and the Marines is telling on the ranks of skilled workers in war plants. Policies of the various draft boards are so widely varied that management has little chance to determine or even guess as to who will be in the Army next. Training of women is proceeding but it is difficult to find enough of them with the strength and other qualities to permit rapid and full-scale machine operation training.

•

IT is believed that WPB will soon have to tackle the manpower problem as it will affect metal distribution and output.

If some of the present success in the balancing out of war component parts is to be maintained, WPB will have to look into the skilled worker problem to a greater extent than has been done. Companies have been reluctant to give the full facts on this matter since there might be an effort made by some to question their patriotism. Furthermore, industry has bent over backwards in making application for deferments, attempting, as far as possible, to ask for only those deferments which it believes will stand the real test. Some companies have gone so far as to set up committees which investigate thoroughly the work record of its men, the chances of replacements and the possibility of retraining others in the organization before any attempt is made to ask for deferments. But in recent weeks, Army requirements have been so great that ranks are being thinned out at some places at an alarming rate. Some sources believe that this country will run into the same difficulties encountered in England along this line when some men in the Army were returned to production.




**Steel Ingot Production by Districts Per Cent of Capacity**

| Week of | Pittsburgh | Chicago | Youngstown | Philadelphia | Cleveland | Buffalo | Wheeling | South | Detroit | S.Ohio River | West | St. Louis | East | Aggregate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| August 20 | 97.0 | 102.0 | 98.0 | 87.0 | 95.0 | 104.5 | 86.0 | 93.6 | 100.2 | 100.0 | 102.0 | 92.0 | 82.3 | 96.0 |
| August 27 | 97.0 | 103.0 | 98.0 | 92.8 | 100.5 | 106.5 | 86.0 | 96.6 | 100.3 | 100.0 | 102.0 | 92.0 | 81.3 | 97.6 |

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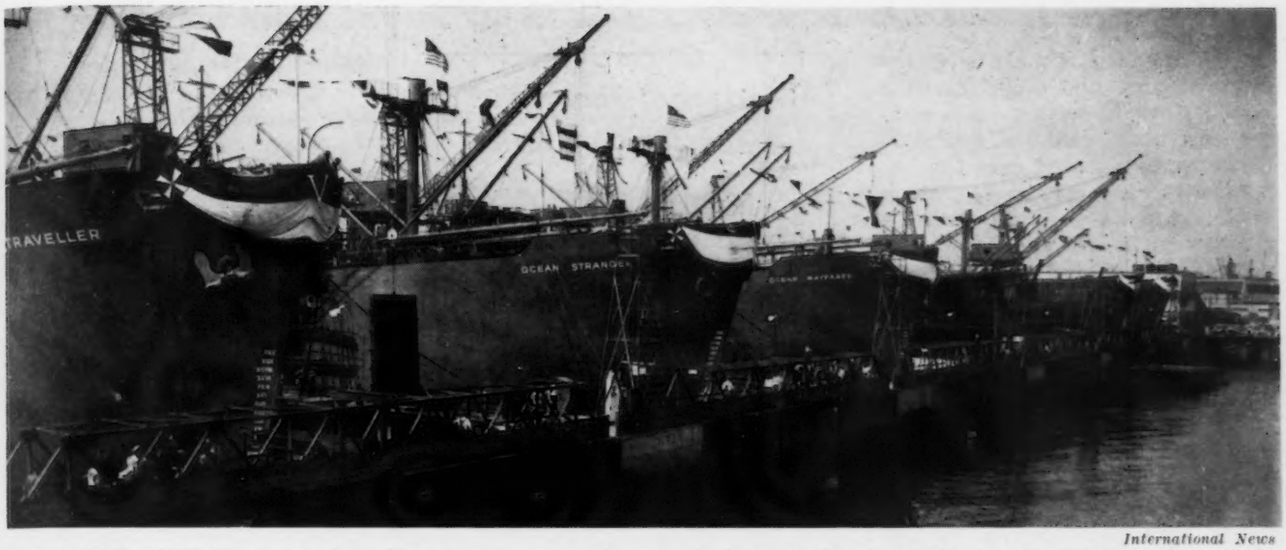


*International News*

**10,000 TON QUINTS: A new launching record was made recently in South Portland, Me., by the Todd-Bath Iron Shipbuilding Corp., when they simultaneously launched five 10,000 ton freighters built for the British Ministry of Transport. The ships were built in sunken basins and launching consisted of merely flooding the locks.**

## *Steel Branch Men Not "Palmed Off Salesmen," Donald Nelson Says*

**• • • WPB Chairman** Donald M. Nelson last Saturday at a press conference branded as "absolutely untrue" that the Board's Iron and Steel Branch is filled with "palmed off steel salesmen." Nelson said that just because these men held sales positions with their companies it did not mean that they did not have adequate training and knowledge of the industry.

Records of officials show that they occupied high positions, some of them vice-presidents in charge of sales for organizations that marketed many millions of dollars' worth of steel each year.

This was Mr. Nelson's answer to the smear campaign that has as its object the wholesale elimination of $1-a-year-men, especially in the Iron and Steel Branch. Underwriting the campaign are organized labor officials and certain New Dealers who want to take over the conduct of the war. Predictions are being made that sooner or later there will be a showdown between these groups and Mr. Nelson.

**Mr. Nelson told the press that** he is boss of the War Industry setup. This was said to have been the principal reason for his calling the conference. It was apparently his purpose to answer mounting criticism that he had allowed the ball to be taken from him. Charges had been made that the War and Navy Departments had taken over. But in announcing his "toughened up" policy, Mr. Nelson showed no resentment toward the armed forces, for he did not concede by any means that they had encroached on his preserves. On the contrary, he said that there is no ill feeling between WPB on the one hand and the Army, Navy and Maritime Commission on the other hand. To indicate, however. that he intends to be boss, Mr. Nelson added that "they are working for me."

*News of Industry*

His defense of the Iron and Steel Branch came several days after Mr. Nelson had Frederick I. Libbey fired because of publication in the *Washington Post* of a confidential report prepared by Mr. Libbey, a "labor consultant," before the report was submitted to the WPB chairman. The report made an attack on the Iron and Steel Branch and urged a widespread shake-up in the branch. It referred to the branch personnel as "primarily steel salesmen rather than production engineers—salesmen whom the major steel companies were glad to palm off on the Government after the rapidly expanding war program made further effort to sell steel unnecessary."

**Regardless of what** changes may be made in the Iron and Steel branch, which being a large organization constantly sees a turnover, Mr. Nelson pointed out that it should contain men from the steel industry and not "grocer clerks." The WPB chairman had been asked if his insistence on industry members being employed by the branch was not a "freeze out" of labor. Mr. Nelson sharply replied that "labor is not being frozen out of anything."

"Who else knows steel, except people in the steel industry?" Mr. Nelson inquired.

WPB spokesmen said that Mr. Nelson's primary reaction to the news account of the Libbey report was one of anger. He is reported to have objected vigorously to the publication of a confidential report and contended that it should not have been given sensational display. Such display was not merited, it was declared, for a report originating at such a low level of the WPB organization.

The Libbey report had its ridiculous points. For one thing it would disregard the fact that a war is raging and that the United States is engaged in a most desperate conflict.

This business as usual attitude was seen in the recommendation that "new blood"—technical men who know all the aspects of the industry—be transfused into the

branch and that it make a survey of all existing steel capacity as the initial move in setting up a comprehensive plan for the most efficient use of all steel facilities.

Surveys and plans of which Washington has a great excess—no shortage here at least—and time killing while Rome burns is Mr. Libbey's ideal which calls for studies that already have been made down to the last pound of steel. With it, Mr. Libbey would set up a warrant system, which would indicate that Mr. Libbey sought credit for the board's allocation system recently set up.

**The report which in many** respects paralleled that of Phillip Murray, head of CIO's United Steel Workers, made some time ago, charged that large mills were wasting capacity by rolling narrow types of steel on wide mills while small mills were idle. Mr. Libbey's point is not entirely clear and perhaps reflects a lack of intimacy of steel operations for obviously a "small plant might have a wide mill while a large mill might have narrow mills as is the actual situation. As it happens one comparatively small mill has the widest plate mill in the world. Mr. Libbey, so said the published story on his "confidential" report, did not ascribe the situation he referred to as any deliberate neglect of the small mills by officials in the iron and steel branch. Instead, he made the curious point that branch officials "have ignored small mills because they do not know what small mills can do—a crying reason for an inventory of all production sources." Mr. Libbey's thinking seems to be that only representatives of large steel mills are in the Iron and Steel branch, and this does not happen to be the case.

**Mr. Libbey's report** "leaked" in perfect timing with the CIO-AFL drive for a broad reorganization of WPB so as to give labor a greater voice in the board. Laying aside for the moment their hostility toward each other, the two groups held a joint meeting soon after Mr. Libbey was tossed from the board organization. Soon after, the CIO drew up a resolution asking that Mr. Libbey be reinstated. Simultaneously a number of consultants in the board's labor division, making a gesture of coercion, threatened to resign en masse unless Mr. Libbey was put back on the job. The resolution charged that "the only conclusion" which could be drawn from Mr. Libbey's discharge was that he was dismissed for "telling the truth."

This statement joined an issue of veracity in view of the subsequent statement of Mr. Nelson regarding the competency of the Iron and Steel branch. The resolution, like the Libbey report, made a cheap attack on the Iron and Steel branch and called for the removal of "deadwood, the misfits and those who think in terms of complete business habits and business as usual." This outburst, which undoubtedly was shared by AFL as well as CIO, had a definitely ironical tone when the record of organized labor since Pearl Harbor is considered. Both groups have made empty pledges of no strikes for the duration.

**The record shows how hollow** the pledges have been. According to the Bureau of Labor Statistics in June, 1942, there were 350 strikes. In May, also of this year, there were 275 strikes. In the peacetime five-year period of 1935 to 1939 the average number of strikes in June was 290.

The Libbey report is said to have been prepared at the request of Wendell Lund, chief of the WPB Labor Division, though Mr. Nelson said that he had not found out who authorized the report. He said that his knowledge of the report was confined to the newspaper account. The consensus in Washington is that it was publicized in advance of its submission to Mr. Nelson with the object of attracting attention of the Truman Senate Committee which has begun an exhaustive witch hunt in the steel industry. It may be added that since it has been made public interested WPB officials, particularly its steel representatives, are said to be anxious that the report be presented to the Truman Committee in order that they can make a public reply.

**Mr. Libbey, who had also** analyzed the Murray plan, and approved it generally, but found in it a few "technical errors," found a shortage of steel making capacity but said that the program can be improved considerably by converting more steel mills to the making of plates, which were declared to be the most critical type of steel today. This is an interesting recommendation coming as it does at almost the precise time that WPB had directed a decrease in steel plate production in order that there will be an increase in other kinds of steel so as to give a better balanced production.

Despite the publicity given to plate shortage, it is well known that the greatest concern of the Iron and Steel Branch relates to the supply of alloy steel.

The Libbey report says that raw materials for steel are limited. A statement as obvious as that is true of all things. He referred to pig iron and scrap and said that the shortage can be "considerably lessened" by a greater effort to bring in scrap and by expanding pig iron capacity of small producers. These things are being done, though Mr. Libbey's idea of a small producer may not accord with that which commonly prevails. Production should be so concentrated under an overall plan that mills will do what they are most able to do, the report suggested. That is what they are doing, it is assumed, unless prevented by government orders from doing so. This recommendation does not seem to tie in with the plea for what are called the small producers. Mr. Libbey also urged greater use of the Bessemer process whose capacity he said can be expanded.

The WPB expansion program says that a policy should be adopted to provide for any additional, necessary Bessemer capacity.

## *Workers at Tank Arsenal on Strike*

*Detroit*

• • • **Because of a** union jurisdictional dispute at the Detroit Tank Arsenal of Chrysler, involving employees of a sub-contractor, 475 AFofL construction workers stopped work Friday morning, and as late as Monday noon were still on strike.

Ed Thal, secretary of the Detroit Building Trades Council ordered the 475 AFofL construction workers to strike when Chrysler management refused to interfere in the dispute which involved the David-Ludwig Co., sub-contractor for the installation of paint booths and ovens. This sub-contractor hired 40 CIO workers for this job, and the AFofL asked that they be fired and AFofL members hired.

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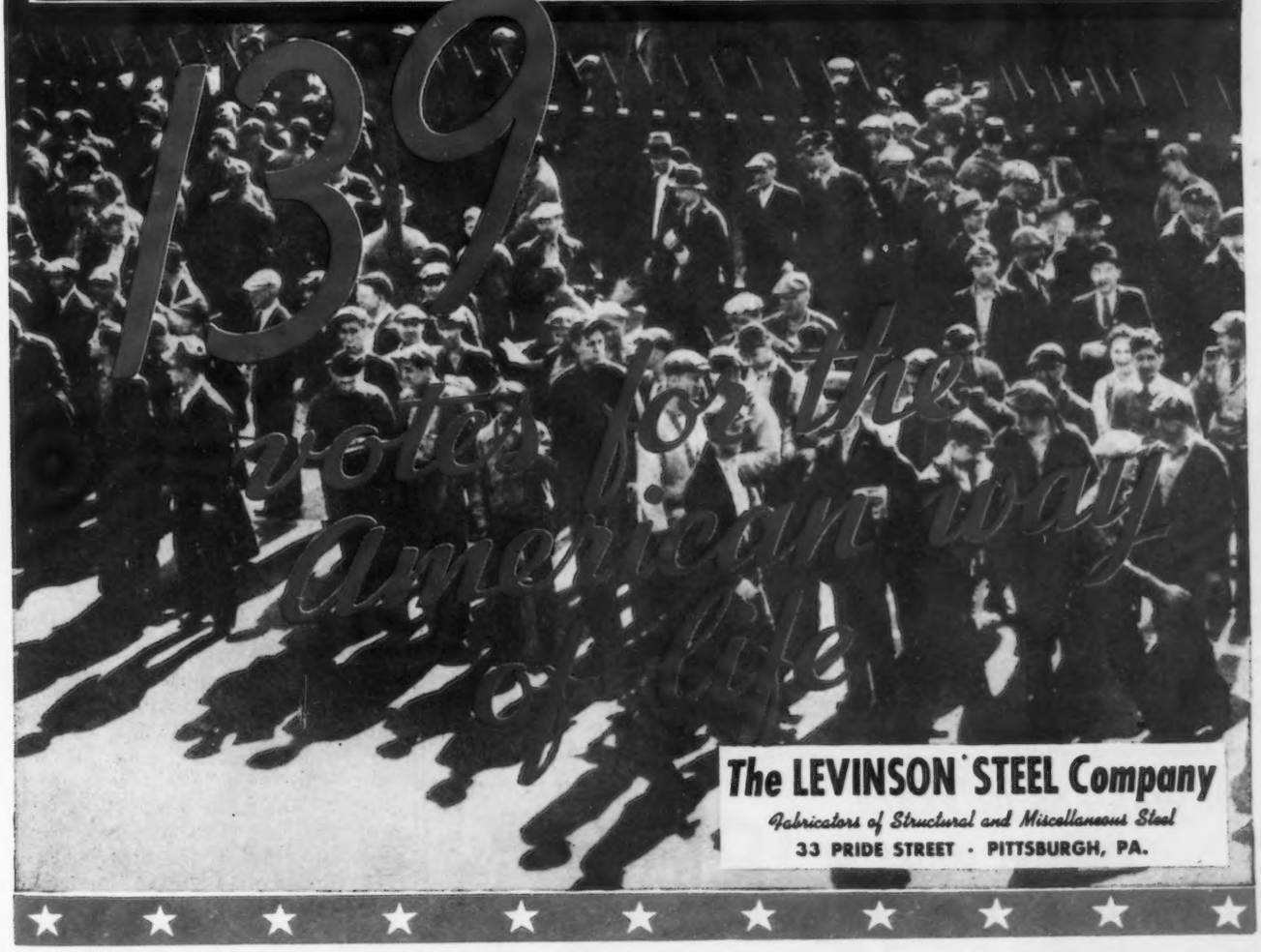


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## *War Plants to Lose More Men to Draft*

*Cleveland*

• • • **The next big headache** of the war plants here is expected to be the drafting of skilled men who had been formerly deferred and classified as 1-B. This danger is appreciated by most of the personnel managers of the larger war plants in this area, particularly in view of the decision to reclassify those men in the 1-B group to 1-A.

One practice which has been frowned upon by military authorities was that successive deferments had been claimed for skilled men, even though the companies where such men were employed had been notified at the time of the original call to train new men to replace the men to be drafted at the end of the original deferment period. Lack of initiative by a few companies and their unwillingness to train replacements has resulted in the extension of deferments on too many occasions, and such plants will probably find trained men drafted from them without having replacements on hand.

**Within the next few months** thousands of men are expected to be drafted out of war jobs at various plants in this area, with one plant expecting to lose some 3000 or 4000 men. Realistic personnel men have taken this for granted and are now engaging in large scale training programs, particularly the training of women and men in the 3-A classification. War plant executives feel that there is no help for the coming development, but they appreciate the fact that it will cause some temporary disruption in the production of war materials.

## Automotive Branch Head Named

• • • **R. L. Vaniman,** Detroit, has been appointed chief of the automotive branch of WPB, succeeding Ernest Kanzler, also of Detroit, who recently was appointed deputy chairman for program progress. Mr. Vaniman has been assistant chief of the branch, and was formerly executive manager of the African Division of Chrysler Corp.

*Harris & Ewing*

**NEW DIE; PRODUCTION IDEA: Theodore Hanby of the Federal Shipbuilding & Drydock Co., using his head as well as his brawn, designed a new die which forms six pipe hangers at once instead of one. Production increase for the operation now stands at 300 per cent.**

## Hundreds of Iron and Steel Jobs Filled by English Women

• • • **In England,** women are employed in 26 job categories in blast furnace plants, 55 in drop forging, 68 in iron founding, and 80 in iron and steel tube, pipe and fittings making, as well as in numerous capacities in iron puddling, steel smelting, and iron and steel rolling, according to "Wartime Employment of Women in the Iron and Steel Industry," a booklet issued by the British Iron and Steel Control. In a foreword, employers are urged to employ women wherever possible.

Among the blast furnace jobs which women are filling, the following were listed: hoist driver, hauler driver, coke belt attendant, transfer car, stove changer, floater, ore filler, loader, crusher, bell attendant, mixer, weighman, crane driver, coke loco driver.

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## *Large Scrap Tonnages May Soon Be Exported To U. S. by the British*

*Washington*

• • • **As a partial** answer to the iron and steel scrap shortage machinery has been started by the Government to reverse the flow of old material. Plans are under way to bring scrap from England, which traditionally, has imported scrap in normal times from the United States. England is reported to be comfortably situated with respect to supplies. The United States finds itself in a directly contrary position. Part of the shortage in this country is due to heavy Lend-Lease exports of raw and semi-finished steel to England and Russia. Home scrap recovered from this steel has been kept in those countries.

In view of England's reported large volume of scrap that has been built up from past peace-time imports, from abandoned railroads, bombed cities and prime

*More about scrap on page 120*

steel taken from the United States during the war period, it is said that that country now is in a position to return old material to the United States without having to suffer from shortages of scrap for the war effort.

**What amount of** scrap may be imported from England has not been estimated but it has been indicated that the tonnage has the potentiality of being large and important since it could be carried as ballast in incoming ships. Plans are said not to have progressed to the point where it is known just what sort of scrap the imports will be, whether they will come from old scrap piles or from new American steel shipped to England. The assumption is that if the scrap is purchased it would be bought by the Metals Reserve Co., though suggestions have been made that, like the ship movement itself, it should be taken under a reverse Lend-Lease arrangement.

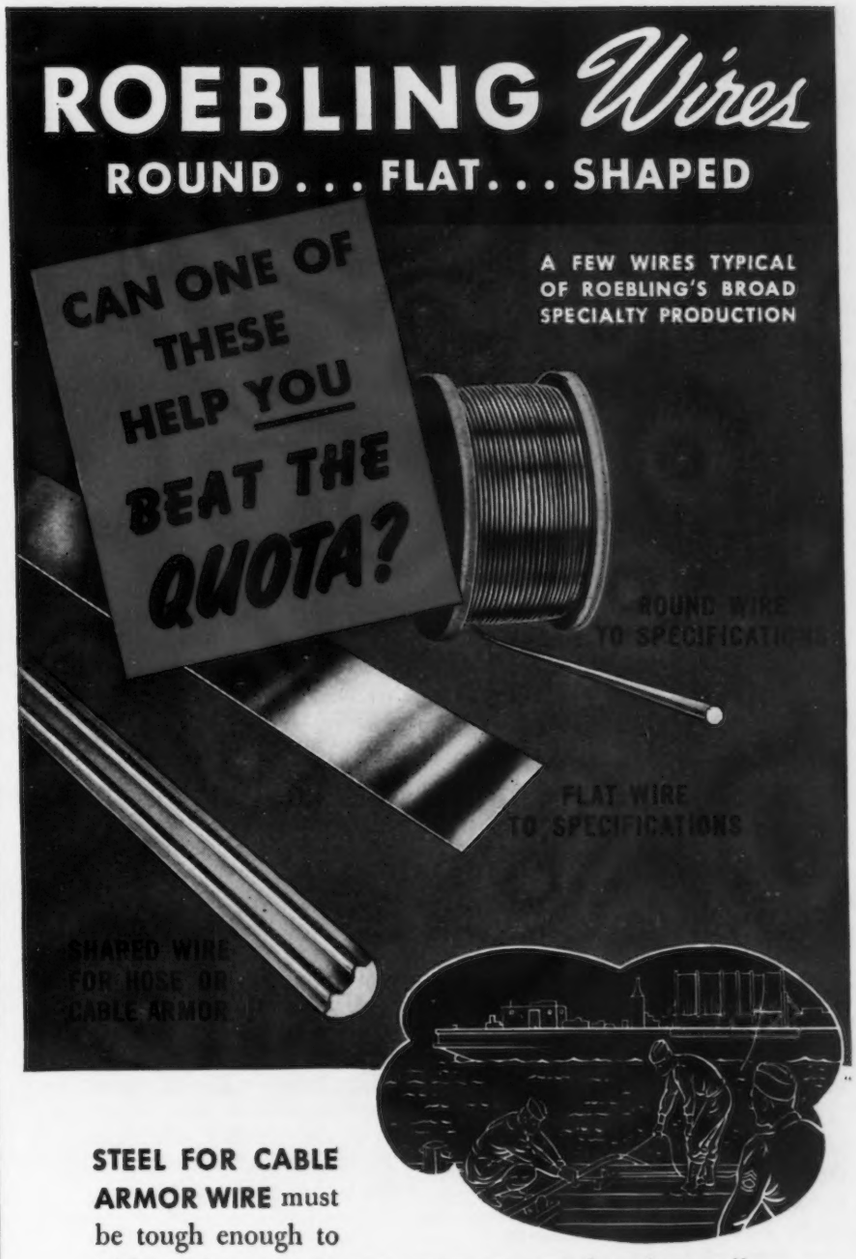
Meanwhile, the development of plans of RFC's recently organized War Materials, Inc., to purchase a minimum of 5,000,000 tons of high cost iron and steel scrap is being watched with considerable interest. It is the expectation that, whether or not the new Govern-

### *Seniority Lost If Dues Not Paid*

• • • **A new Maintenance-of-Membership** arrangement is reported to have been included in a recent labor-management contract signed by one of the nation's leading manufacturing companies and its union employees. The arrangement provides for loss of seniority by employees failing to maintain their membership in the union, instead of the usual provision requiring the employer to fire such workers. The formula was worked out after the union insisted upon a "maintenance of membership provision," while the employer refused to sign an agreement that would compel him to fire workers who should subsequently decide to leave the union. It is reported that this plan may be adopted in other contracts where the major bone of contention is the maintenance of membership issue.

ment agency achieves its goal, it definitely has the possibility of giving a strong fillip to the salvage program. One fundamental question is the extent to which the organization is willing to go to pay above OPA prices in order to get old material to the steel mills. There are large quantities of dormant scrap that can be had at a price. Heavy untouched tonnages, not heretofore available because of the OPA ceiling prices, according to the steel and scrap trades, can be gathered from such sources as old buildings, farms, abandoned rail lines and mines.

**That recovery of** scrap from such sources would mount up to a large volume, if War Materials is prepared to pay the price, has been made clear by casual studies. One of the largest sources, it has been disclosed, are the mines where good scrap from old machinery and rail lines can be recovered. In West Virginia alone, it is reported that 200,000 tons of No. 1 and No. 2 scrap can be recovered. But the cost will greatly exceed OPA ceiling prices. That this is so was shown by the experience of a dealer who purchased mine scrap at only $1 a ton, yet by the time it had been trucked to a yard, prepared and then shipped to a mill at OPA prices, the dealer suffered a loss.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## Machining of Aluminum Described in Alcoa Booklet

• • • **A comprehensive booklet** entitled "Machining Alcoa Aluminum" has just been published by the Aluminum Co. of America, Pittsburgh. It is divided into two parts covering general machining practice and automatic screw machine practice. The first section discusses tool shapes for engine lathe and planer tools, milling cutters, threading tools, drills, reamers, saws and files, while the second section discusses drills, form and cut-off tools, box tools, and threading tools used on automatic screw machines.

Tables give the chemical composition of commercial aluminum alloys and speed and feed data for rough and finish machining. Copies of the booklet are available on request.

## Price Office Opened at Chicago

*Chicago*

• • • **Covering the Chicago** metropolitan area, including the surrounding suburban districts and extending from the Indiana line through the Western and Northern suburbs up to Waukegan, a new price division office has been opened here by the OPA. It constitutes one unit of the metropolitan office of the OPA. The address is 228 North LaSalle street and the office will be under the direction of Dr. Elmo P. Hohman, who is on leave of absence from Northwestern University.

## Soldiers' Wives Urged To Apply for War Jobs

*Cleveland*

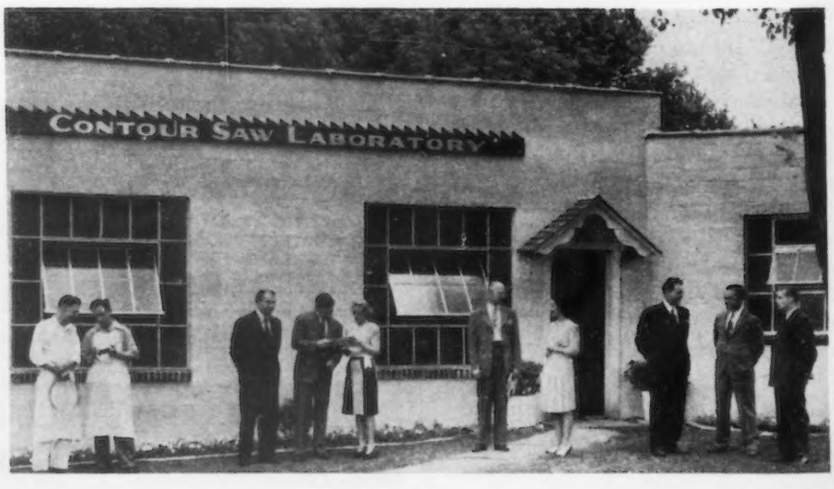
• • • **The Axle Division** of the Eaton Manufacturing Co. has sent letters to the wives of former employees, now with the armed forces, inviting them to apply for jobs at the company. Company officials pointed out that their ex-employees would probably be relieved to know that their wives are able to get along and to know the conditions under which they are working. Four wives of ex-employees have already been hired as a result of the offers, and many more are expected to be employed.

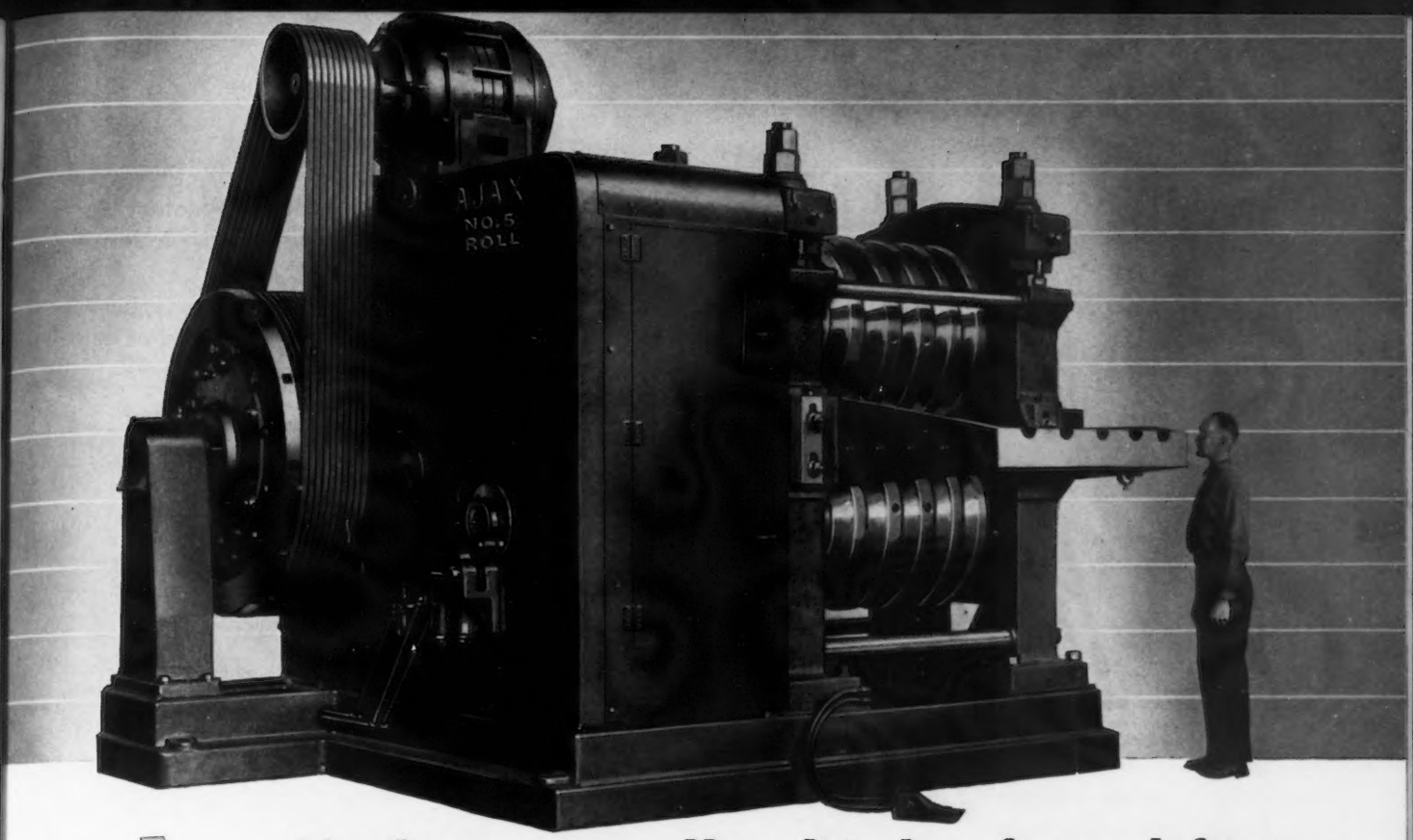
## Pratt & Whitney Name Shops After Knudsen and MacArthur

*Hartford, Conn.*

• • • **Outstanding feature** to those present at the Army-Navy "E" presentation to Pratt & Whitney division, Niles Bement-Pond Co. was the dedication of two new large shops, one of which was named in honor of Lt. General William S. Knudsen, War Department production chief and the other in honor of General MacArthur. In making the award to the company and its employees General Knudsen said in part: "Please don't think I am in a class with MacArthur. He's in a class by himself. I'm just a worker like you folks. The only difference is you are away ahead of me."

**LABORATORY EXPANSION: The expanded contour saw laboratory of the Doall Co., Des Plaines, Ill., housed in a brand new building, will give technical solutions to many narrow blade saw problems. Members of the staff are shown admiring the new structure.**






# Airplane propeller blades forged faster ...free from fiber interruptions with

# AJAX *WIDE ADJUSTMENT* FORGING ROLLS

The speed and facility with which Ajax Wide Adjustment Forging Rolls draw the long tapered blanks for airplane propeller blades preparatory to finish forging in a hammer makes them indispensable in propeller production. The rolling operation is fast and the blanks are drawn accurately to cross-sections which fill out the entire length of hammer die impressions with negligible flash and a minimum number of hammer blows consistent with thorough working of the metal.

Of vital importance is the assurance that finished propellers drawn on Ajax Forging Rolls are absolutely free from transverse fiber interruptions that occur when blanks are drawn on a hammer and result in fatigue failures in flying service.

Blanks of steel, aluminum and magnesium are being drawn for a wide range of military and industrial products on Ajax Wide Adjustment Forging Rolls. Their operation is extremely simple and their production, particularly on long draws, is many times that of the fastest swagers or trip hammers.

An outstanding improvement is the wide adjustment gearing (patented). It permits adjustment between roll dies approximately 6 times that of earlier designs, thus reducing die maintenance to a fraction of former requirements. Backlash is eliminated and the smooth operation of these rolls is reflected in the regularity of the surfaces rolled.

Ajax Forging Rolls are made in five sizes covering the entire field of forging that can be handled manually. All sizes possess outstanding Ajax features that merit your purchase of Ajax Wide Adjustment Forging Rolls on the basis of mechanical soundness. Write for Bulletin 91-A.

Blade Blank having extruded tong hold and blank drawn to tapered elliptical section prior to hammer forging.

★

**BUY FORGING EQUIPMENT ON THE BASIS OF MECHANICAL SOUNDNESS**

★

**AJAX FORGING ROLLS ALSO SPEED THE PRODUCTION OF:**

Gun Barrels — Machine Gun Barrels

Anti-Tank Gun Barrels

Automatic Rifle Barrels — Certain types of Bayonets

THE AJAX MANUFACTURING COMPANY

EUCLID BRANCH P. O. CLEVELAND, OHIO

621 MARQUETTE BUILDING • CHICAGO, ILLINOIS

Been lacking time and manpower to organize your own priorities department?

The new Frasse Priorities Division will be glad to pinch-hit.

Manned by specialists, this new Frasse Division has only one job—to know priorities and the latest interpretation thereof. You are welcome to use it as if it were your own.

Incidentally, this latest Frasse Service has already developed a new wrinkle—a Master Check List containing a complete digest of the "dope" that must be shown on your steel orders. Incomplete priority data, you know, can hold up your order for days. A quick check against the Check List prevents any oversight. Care for a copy? Just mail the coupon below.

Meanwhile, file this memo in your source book of priority information. Next time you hit a puzzler on steel priorities, write or call: *Priorities Division, Peter A. Frasse and Co., Inc., 17 Grand St., N.Y.C. (Walker 5-2200) • 3911 Wissahickon Avenue, Philadelphia (Radcliff 7100 - Park 5541) • 50 Exchange St., Buffalo (Washington 2000) • Jersey City, Hartford, Rochester, Syracuse, Baltimore*

**FRASSE *Mechanical* STEELS**

**SEAMLESS STEEL TUBING • COLD FINISHED BARS**
**ALLOY STEELS • DRILL ROD • WELDED STEEL TUBING**
**COLD ROLLED STRIP AND SHEETS • STAINLESS STEELS**

PETER A. FRASSE AND CO., INC.
17 Grand St., New York City

Please send me, without obligation, a copy of your new Master Check List of Priority Requirements.

Name.....

Firm.....

Address.....



## Machine Gun Production Up; Canada Makes New Tank Guns

*Ottawa, Canada*

• • • **Canada made new** production records for the Bren light machine gun and the No. 4 rifle in the past three months, C. D. Howe, Minister of Munitions and Supply, announced. Mr. Howe stated that Bren gun production during the second quarter this year was almost one-third of the total output of these guns up to June 30. Since obtaining substantial production of the Bren gun, its cost has been reduced from $390 in the first quarter of 1941 to $192 in the first quarter this year. For every four No. 4 rifles turned out in June an extra one was produced in July.

Mr. Howe also reported that Canada has begun the production of a new and improved rapid firing tank machine gun. Known as the Browning .30-caliber tank gun, the new weapon is being made according to latest design of United States Army experts. It will be fitted into tanks for Canadian as well as British and Russian use. The Minister also reported a speed-up in the monthly output of the Browning aircraft machine gun.

## Canadian Plants to Make Bonderized Steel This Fall

*Toronto*

• • • **Arrangements have been** completed whereby two Canadian plants at Hamilton, soon will be engaged in the production of bonderized steel, a substitute for tin which has been developed in the United States. The Steel Co. of Canada, Ltd., and Dominion Foundries & Steel, Ltd., will be the first plants in Canada to enter into the production of bonderized steel. Arrangements have been made for granting of priorities by the United States and approving of patent rights by that country, so that production may be started here. Officials of the two companies have been investigating the possibilities of bonderized steel for some time, and both companies now are engaged in constructing plant additions to house the necessary equipment. Arrangements have been completed for importing the special machinery from the United States.

## Superior Ore Consumption Gains Slightly in June

*Cleveland*

• • • **Consumption of Lake Superior** iron ore during July exceeded the June total of 7,033,584 gross tons, but failed to top the May record of 7,239,788 gross tons, with the Lake Superior Iron Ore Association reporting 7,175,845 gross tons consumed last month. It is believed that badly needed repairs on blast furnaces accounted for the slightly lower average daily rate of consumption than was witnessed in either June or May of this year. In any event, up to Aug. 1, a total of 49,116,562 gross tons of iron ore have been consumed by American and Canadian blast furnaces, as compared with 43,178,525 gross tons for the similar interval of 1941.

**An indication** of how much ahead of last year our ore movement for 1942 is may be gleaned from the fact that even though we have consumed about 6,000,000 more tons thus far this year than in the same period of 1941, the total stocks of iron ore on hand on Aug. 1, 1942, in the United States and Canada amounted to 37,326,533 gross tons, as compared with the 31,597,386 gross tons on hand a year ago. Moreover, the Aug. 1 stocks were well above the 30,930,991 gross tons on hand on July 1. Of the Aug. 1 total only 1,093,974 gross tons represented tonnage at Canadian furnaces, with the balance being at U. S. furnaces and at Lake Erie docks. On Aug. 1, 172 U. S. furnaces and 9 Canadian furnaces were in blast, and only 9 U. S. furnaces were idle.

## Canada Spends More Than 300 Million for War in July

*Ottawa, Canada*

• • • **Canada's outlay** on war account during the month of July attained the record total of $302,858,779, of which $190,358,779 was placed on Canadian account and $112,500,000 on United Kingdom account. As a result of the expenditure in July more than half of Canada's $1,000,000,000 "gift to Britain" has been used, with total expenditures in this connection since April 1 last, $548,928,633. Canada's direct war expenditure, in excess of outlay on British account, during the same period was $671,612,820.

That old boiler or worn-out machine—in fact all the scrap steel lying around your plant—is a potential arsenal for the United Nations. Fifty pounds will help make enough steel for a machine gun . . . 500 pounds for a one-ton bomb . . . 1000 pounds for a 75-mm howitzer. (About one-half ton of steel scrap is required for every ton of new steel produced.)

*How Much* Scrap is Needed? Six million tons more than can be obtained from regular sources of scrap this year. War production and perhaps your own business will suffer unless these *extra* tons are collected by December. But it doesn't stop there. The effort must be continued as long as the war lasts.

All scrap collected will be purchased by the steel industry at government-controlled prices.

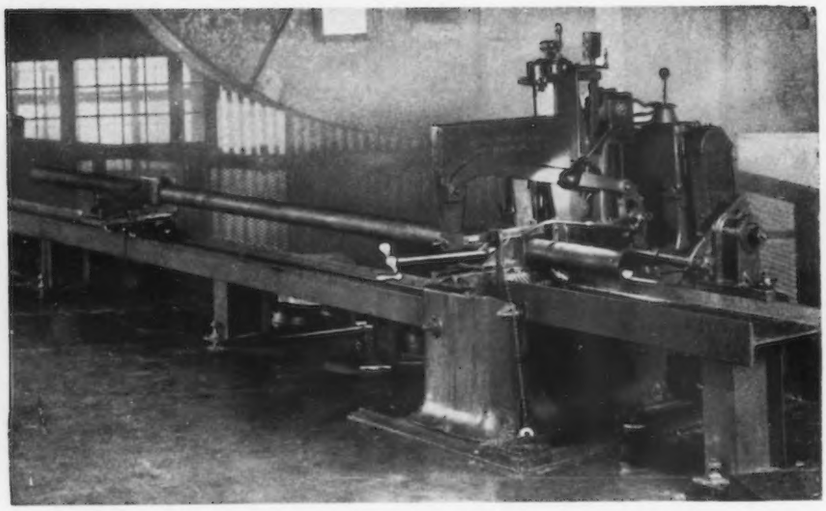
Is *Your* Plant Doing Its Part? Do you have a wide-awake salvage committee for every department . . . a salvage "clean-up day" every week . . . a plan to scrap all worn-out or obsolete machines and their spare parts? And remember, most old jigs and dies around your plant will be out of date after the war.

We're all in this together and the only way out is to get together. Help speed the scrap collection job—now and for the duration. It will help shorten the war. The American Rolling Mill Company, 2651 Curtis Street, Middletown, Ohio.

ARMCO

**TURN IN ALL YOUR SCRAP**

**This advertisement is in support of the Salvage Program of the Conservation Division of the War Production Board.**



**cut-off metal the economical way**

The most economical method of cutting-off identical pieces from bar steel is with a MARVEL Automatic Production Saw. It will give you more pieces per hour, per machine and per dollar cost than any other accurate cutting-off method. Figured in cost per piece, it will have the lowest labor cost too, because MARVEL Automatic Saws operate with no more attention than an automatic screw machine. They keep chip loss down to a minimum and on many jobs will give you extra pieces per bar.
For fast automatic production or for single-cut miscellaneous work, MARVEL 6A or 9A Hack Saws are fast, accurate tools. Capacities 6" x 6" or 10" x 10", single or nested bars. Write today for Bulletin N. 600.

MARVEL SAWS

ARMSTRONG-BLUM MFG. CO.
*"The Hack Saw People"*
5700 Bloomingdale Ave.
Chicago, U.S.A.
Eastern Sales Office:
225 Lafayette St., New York

**TOLERANCE-**
**a vital figure in spring performance**

It pays to analyze your spring tolerance requirements in the light of exact needs. You'll help your springmaker and yourself by being specific. If your spring design is tough — requiring close tolerances, Dunbar's is the place to get them. If, on the other hand, tolerances are easy, and mass production your desire — Dunbar's also is the place to go.

The spring you need is the spring that does the work—no more, no less. Let your springmaker help you to get it. Let your springmaker be

**Dunbar Bros. Co.**
DIVISION OF ASSOCIATED SPRING CORPORATION
BRISTOL, CONNECTICUT
*"Quality Springs Since 1845"*

## Contract Re-Negotiation Clauses Cause Some Concern

*Cincinnati*

• • • **Although new business** is still far from niggardly, the tempo of ordering has slowed down considerably in the last month. With this coming of a slight ease in the order departments, manufacturers are attempting to make an appraisal of the general situation. Chief, of course, among their concern, is the attitude of Washington on the innumerable orders, requests and policies that have been adopted with reference to war contracts. Particularly in the forefront during the recent weeks has been the re-negotiation clauses that have been inserted in contracts, particularly as the result of a statute passed by the last Congress. Some effort is being made to have the law reconsidered and perhaps repealed, and in the interim the industry generally has to consider what its position is going to be, since under the law, it is virtually impossible to figure profits until the expiration of the period provided for in the law. While of course, the OPA ceiling tends to dispel any possibility of an assertion of excess profits under the re-negotiation clause, the position is not absolutely safe by any means.

Serious reaction also is noted to the proposed law forbidding the payment of any contingent fees on contracts, because of the effect this will have upon sales agents' commissions. As the law is set up, it forbids any fee or payment of commission contingent upon the placing of orders and can easily be construed to apply to sales agents' commissions under the present setup. Considerable help in resisting the passage of the bill is coming from real estate boards and from other industries who operate on the same basis.

## Inventor's Council Reports 91,823 Win-the-War Ideas

• • • **Dr. Charles F. Kettering,** council chairman of the National Inventors Council, states that inventive Americans have submitted 91,823 suggestions which are intended to be helpful in winning the war. Many of the suggestions were contributed by amateurs, according to Mr. Kettering, but were "fruitful and of practical use."

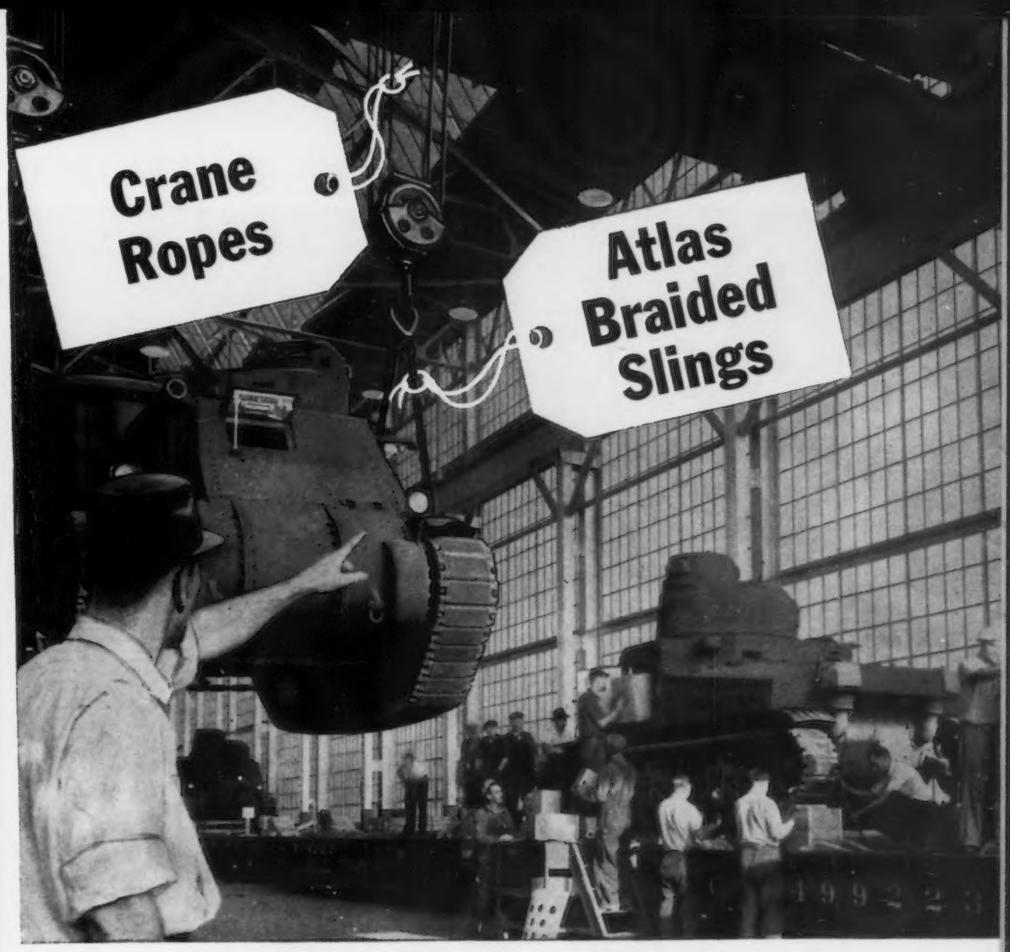
*Canadian Public Information*

**CANADIAN TANKS: Part of the production line in Canada's Ram tank factory, second largest arsenal for tank production in the world. The Ram tank is heavily armed with machine guns and cannon and is powered with a Wright Whirlwind engine.**

## "Old Gent and Self" Get Recognition for Production

*Bay City, Mich.*

• • • **The two-man** whirlwind production group, "the old gent and myself" meaning Percy Fogelsonger, aged 79, and his boss Jake Sparling, aged 60 are happy now that they have received recognition from the U. S. on their production of 18,000 steel flanges for war machinery produced by them in the past 18 months. They have worked 15 hours a day, seven days a week and recently the youngster of the group wrote to President Roosevelt suggesting that "the old gent and myself" would like a pennant for what they were doing. They got it in the form of a large American flag poster with "Give It Your Best" slogan. In addition they were officially recognized as a Labor-Management Production Drive committee.


# TEAMED UP TO SPEED PRODUCTION SAFELY!

On the production front, and on the fighting front, it takes teamwork to win the battle. Macwhyte has been working 7 days a week producing a "team" that's speeding production of war materials in every part of America.

This combination of Macwhyte Atlas Slings and Macwhyte Crane Ropes is moving pipes, tanks, rolls, guns, machines...the list is almost endless...with speed and safety.

These two team up so well because...

**Macwhyte Atlas Braided Slings...**

- Are made from both left-&-right lay endless wire ropes
- Have perfect balance which eliminates spinning
- Are extremely flexible, easy to handle
- Have the positive safety of endless wire ropes

**Macwhyte PREformed Crane Ropes...**

- Are made from selected steels of unusual strength
- Are PREformed to assure l-o-n-g life
- Are specially lubricated to protect against friction and corrosion
- Have high fatigue resistance

Macwhyte Crane Ropes and Slings can help YOU "keep 'em rolling" faster with safety, too. 1. *Write* on your company letterhead for helpful rigging bulletins. 2. *For your rope needs,* tell us the make, model, and capacity of your crane—size, grade, and construction of rope now used—preference rating, use, and approximate date you will be needing the rope. 3. *For your sling needs,* send sketch with details of size and weight of loads to be handled and method of attachment.

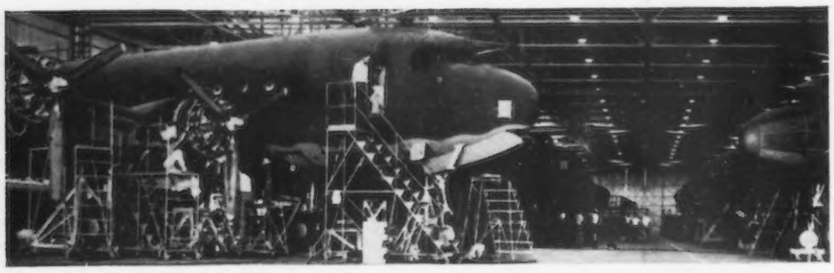
**CRANE ROPES to hoist the load . . .**

**BRAIDED SLINGS to harness it safely. *BUY BOTH FROM***

AD 64

**MACWHYTE COMPANY**

2911 Fourteenth Avenue, Kenosha, Wisconsin—Manufacturers of wire rope to meet every need—Left-&-Right Lay Braided Slings—Stainless Steel Wire Rope—Monel Metal Wire Rope—Aircraft Cable, Aircraft Tie-Rods, "Safe-Lock" Swaged Terminals. *Mill Depots:* New York, Pittsburgh, Chicago, Fort Worth, San Francisco, Portland, Seattle. Distributors throughout U. S. A.



**FLYING BOXCARS:** Pictured on the production line are these giant Douglas C-54, four-motored transports. An Army approved statement says these planes are already hauling men and supplies to our war fronts.


HOW AN HOUR MAY BE GAINED IN *sixty seconds*

Uniformity of size and shape is obtained in a matter of seconds in forming the average forging. One extra blow or two extra blows struck by a forging hammer within a period of 60 seconds may gain an hour by reducing the time it requires to finish a forging. A close tolerance usually requires just one or two extra blows to produce the dimensional exactness that usually decreases the time it takes to machine and finish the forging. Forging to close tolerances is a standard practice in the T & W forging shops where craftsmen of various skills, and hammers of a wide range of capacities are well matched. In these days when every hour gained may mean so much more war equipment for the Nation's fighting forces, T & W forgings can be the means of stepping up production of vital parts. Ask a T & W Forging Engineer about how an hour may be gained in 60 seconds.

FORGINGS
USUALLY COST LESS AT THE POINT OF ASSEMBLY

TRANSUE & WILLIAMS
STEEL FORGING CORPORATION
ALLIANCE, OHIO

Sales Offices: New York, Philadelphia, Chicago, Indianapolis, Detroit and Cleveland


## ODT Moves to Ease Freight Congestion at Coastal Ports

• • • **To facilitate** the movement of export traffic by preventing freight accumulation at the ports, Joseph B. Eastman, Defense Transportation Director, announced on Aug. 18 that the railroads have agreed to place storage-in-transit privileges in effect on carload export freight at points intermediate to the ports. The privilege covers all commercial carload freight other than bulk traffic. Tariff provisions for the movement of freight under the agreement became effective on one day's notice, by authority of the ICC.

The new arrangement will permit flexibility by providing storage facilities strategically located within short running time of the principal Atlantic, Gulf and Pacific coast ports and will expedite deliveries as cargo space is allocated. Additional covered and open storage facilities at interior storage points, if required, will be made available by ODT's Division of Storage.

**In order to** avail themselves of this storage-in-transit privilege, arrangements will have to be made by the shipper or agent for storage facilities in advance of shipment. Traffic will be forwarded to the storage points on the usual domestic bills of lading at domestic rates from point of origin to the storage point. Such bills of lading must carry the statement "Commercial Freight for Storage and Subsequent Exportation Within Four Months, Under the Terms and Conditions of Section 502.42 of General Order ODT No. 16." The terms of this section of General Order ODT No. 16 provide for the movement of commercial freight for export under ODT unit permits.

When shipments are moved from the storage point for export, adjustment in the rail charges will be made to the basis of the through rate applicable on export traffic from point of origin to the port, plus the transit charge.

•

## Air Transport Command Opens Priorities Control Offices

*New York*

• • • **Passengers and air express** shipments, the movement of which is essential to the war effort and which cannot be carried successfully by surface transportation, may now obtain priority. Regional

### *Air Transport Priority Centers*

**New York:** Administration Building, LaGuardia Field
**Havemeyer 4-1230.**

**Washington, D. C.:** (Domestic) Room 5317, Dept. of Commerce Building
**Executive 2460. Extension 1240.**

**Washington, D. C.:** (Foreign) Room 2926 Army Air Forces Annex No. 1, Gravelly Point
**Republic 6700. Extension 73002.**

**Chicago:** Room 204, Administration Building, Municipal Airport
**Portsmouth 5220.**

**Miami:** Room 1803, Congress Building
**Miami 9-3411.**

**Kansas City:** Room 207, Administration Building, Municipal Airport
**Norclay 3666.**

**Seattle:** Room 529, Dexter Horton Building
**Elliott 8207.**

**Dayton:** Room 202 Talbott Building
**Hemlock 6755.**

Priorities Control Offices have been established in New York, Washington, Dayton, Kansas City, Seattle, and Miami. Others are to be opened in key cities throughout the nation under the Air Transport Command.

To obtain an air transport priority a company official need only contact the Army or Navy officer in charge at his plant, or the chief inspectors attached to either of the services. The officer or inspector will telephone the air transport priority office to present the facts necessary to secure a rating. District Army or Navy offices can also perform this function.

In New York the office is located at La Guardia Field. Open 24 hours daily, it will service the eastern region including New York State, New Jersey, all of New England, and Eastern Pennsylvania. Major Mervin P. Bickley is Commanding Officer of the new unit.

If possible, priority requests should be cleared through and certified by the government branch or agency having knowledge of the necessity for the trip or shipment, as outlined above.

## Freight Loading Off 2.4 Per Cent from Year Ago

• • • **Loading of revenue** freight for the week ended Aug. 15, totaled 868,845 cars, according to the Association of American Railroads. This was a decrease below the corresponding week in 1941 of 21,492 cars or 2.4 per cent, but an increase above the same week of 1940 of 125,795 cars or 16.9 per cent.

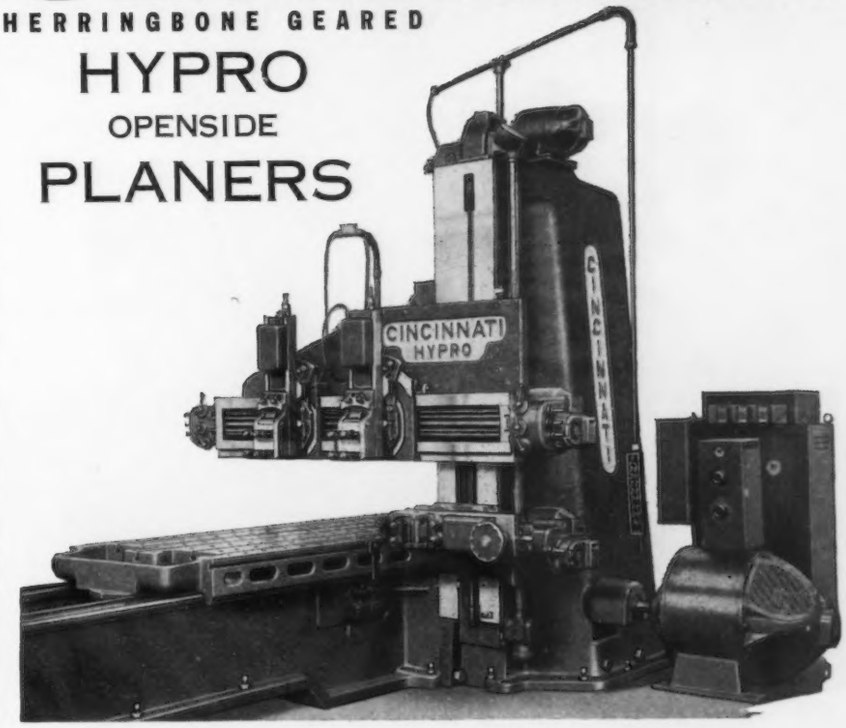
Loading of revenue freight for the week of Aug. 15 increased 19,093 cars or 2.2 per cent above the preceding week.

Miscellaneous freight loading totaled 396,928 cars, an increase of 9802 cars above the preceding week, and an increase of 28,545 cars above the corresponding week in 1941.

Ore loading amounted to 88,424 cars, a decrease of 628 cars below the preceding week, but an increase of 9590 cars above the corresponding week in 1941.


# Cincinnati

HERRINGBONE GEARED
HYPRO
OPENSIDE
PLANERS




All gearing throughout the entire train is of herringbone type. This gives smooth, even flow of power through greater tooth surface. The massive pyramid column is rigid and provides greater accuracy on the Cincinnati Hypro Openside Planer. Ask for Bulletin 110.

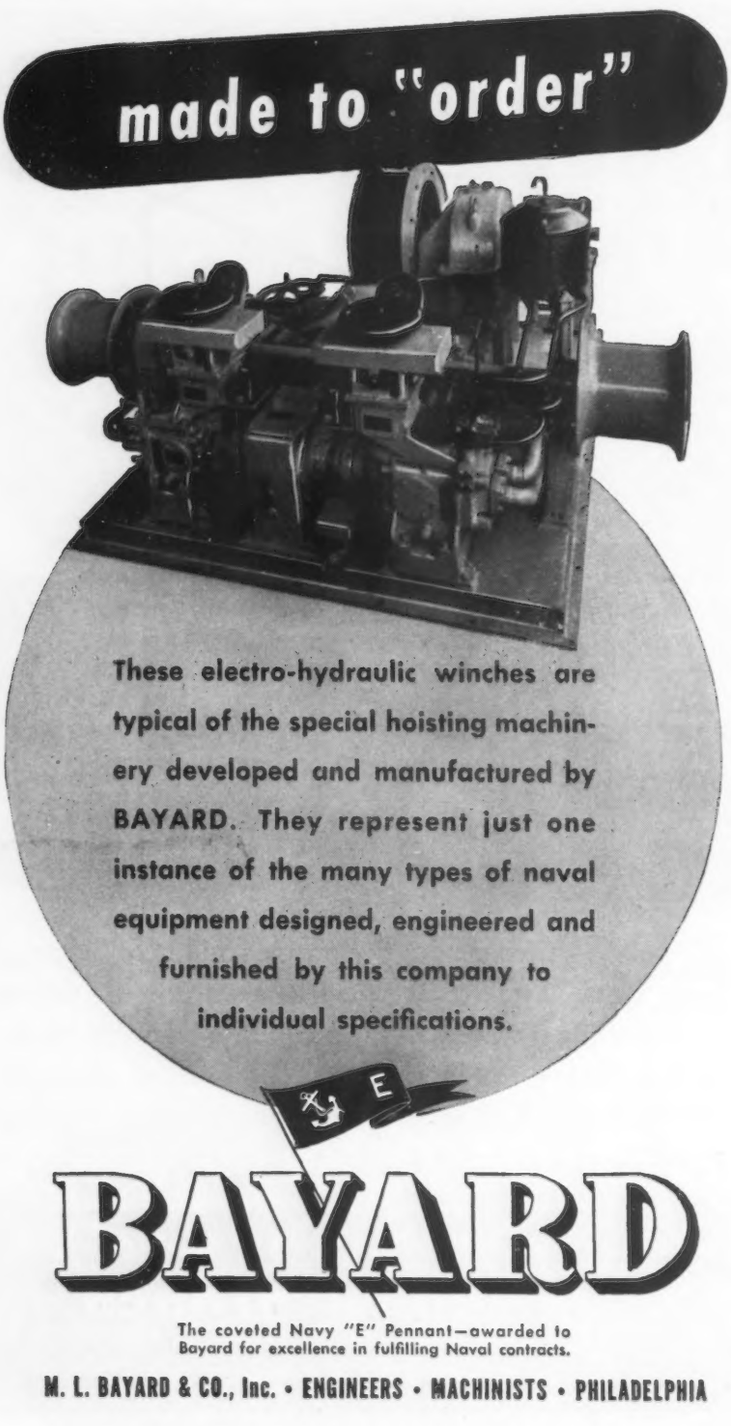
PLANERS · PLANER MILLERS · BORING MILLS
THE CINCINNATI PLANER CO.
CINCINNATI, OHIO

## Wyckoff Steel Fosters Relations With Employee-Selectees

• • • **Wyckoff Drawn Steel Co.,** Pittsburgh, is engaging in a campaign of "human" relations in connection with their war production drive and selectee problem. Noticeable among their recent printed matter are two pieces, of a promotional nature but keyed to promoting employee relations.

First is a new folder being distributed to employees but addressed primarily to the employee's family. Its contents explain importance of the worker's part in the war.

The second, and most impressive, is a framed "Pledge of Fellowship" presented to the family of each selectee called to service. This bears a sincere message of company support of every selectee, his family and the war effort generally.



made to "order"
These electro-hydraulic winches are typical of the special hoisting machinery developed and manufactured by BAYARD. They represent just one instance of the many types of naval equipment designed, engineered and furnished by this company to individual specifications.
E
BAYARD
The coveted Navy "E" Pennant—awarded to Bayard for excellence in fulfilling Naval contracts.
M. L. BAYARD & CO., Inc. • ENGINEERS • MACHINISTS • PHILADELPHIA


## New Armor Plate Group Headed by Armco Man

*Middletown, Ohio*

• • • **G. F. Ahlbrandt,** assistant vice-president, The American Rolling Mill Co., has been appointed civilian chairman of the Armor Plate Production Committee, recently formed by the Tank and Motor Transport Branch of the United States Army Ordnance Department.

Lieut. I. S. Wilbur, U. S. Army Ordnance, has been assigned as government representative to Mr. Ahlbrandt with headquarters in Middletown. For administration purposes he will be under the Cincinnati Ordnance District headed by Col. Fred. A. McMahon.

The establishment of this committee was the result of a meeting called by Col. C. D. Wiman, Deputy Chief, Tank and Motor Transport Branch, U. S. Army Ordnance, in Chicago, recently, which was supported and approved by Brig. Gen. J. K. Christmas to implement the general idea of Ordnance-Industry Integration Committees, inaugurated by Maj. Gen. L. H. Campbell, Jr., Chief of Ordnance.

Representatives of 27 armor plate producing, fabricating and heat treating companies were present for the meeting and will be members of the Armor Plate Production Committee. The primary purpose of the committee is to expedite and enhance armor plate production by an integration of the industry.

•

## Alloy Steels Committee Led by Republic Official

*Washington*

• • • **Martin H. Schmid,** manager of the Alloys Division of Republic Steel Corp., has been elected chairman of the Armament Steels and Alloys Advisory Committee of OPA, it was announced last Friday.

The committee, made up of 10 steel executives, is one of the industry advisory groups created under the Price Control Act. While purely advisory, it serves as a liaison body between alloy steel producers and OPA. Through the Committee, OPA may receive any suggestions the industry may wish to make regarding maximum prices and pricing procedure.

## Cited for Production

***Army-Navy Production Awards***

•

Aetna-Standard Engineering Co., Ellwood City, Pa.
Barium Reduction Corporation, South Charleston, W. Va.
Bendix Aviation Corp., Eclipse Machine div., Elmira Heights, N. Y.
Blanchard Machine Co., Cambridge, Mass.
Briggs & Stratton Corp. (West Plant), Milwaukee, Wis.
Cambridge Screw Co., Cambridge, Mass.
Chain Belt Co., Milwaukee, Wis.
Chevrolet Motor Car Co., Gear & Axle Division, Detroit.
Columbiana Boiler Co., Columbiana, Ohio.
Crawford Manufacturing Co., Richmond, Va.
Cummings Machine Works, Boston, Mass.
Cushman Chuck Co., Hartford, Conn.
Federal Screw Works, Plant No. 4, Chelsea, Mich.
Firestone Tire & Rubber Co., Firestone Park Plant, Akron.
General Machinery Corp., Hamilton, Ohio.
A. C. Spark Plug Division, General Motors Corp., Flint.
Greenlee Brothers & Co., Rockford, Ill.
Hanson-Whitney Machine Co., Hartford, Conn.
Harrisburg Steel Corp., Harrisburg, Pa.
Heald Machine Co., Worcester, Mass.
Hercules Powder Co., Radford ordnance works, Radford, Va.
Hooker Electro-Chemical Co., Niagara Falls.
Kelsey-Hayes Wheel Co., Plymouth, Mich.
National Automatic Tool Co., Richmond, Ind.
Philco Corp., Philadelphia, Pa.
Reed-Prentice Corp., Worcester, Mass.
Remington Arms Co., Denver ordnance plant, Denver, Col.
Remington Arms Co. (Lake City ordnance plant), Independence, Mo.
Rivett Lathe & Grinder, Inc., Boston, Mass.
Savage Arms Co., Utica, N. Y.
Simmons Machine Tool Corp., Albany, New York.
Southwest Boat Corp., Southwest Harbor, Me.
Timken-Detroit Axle Co., Illinois Mfg. Div., Waukegan, Ill., Main Plant, Detroit, Oshkosh Plant, Oshkosh, Wis.
Virginia Bridge Company, Roanoke, Va.
Western Electric Co., New York, N. Y.
White Motor Co., Cleveland, Ohio.
Wisconsin Bridge & Iron Co., Milwaukee, Wisc.

•

## First Army-Navy Award to A Machine Tool Repuilder

*Albany*

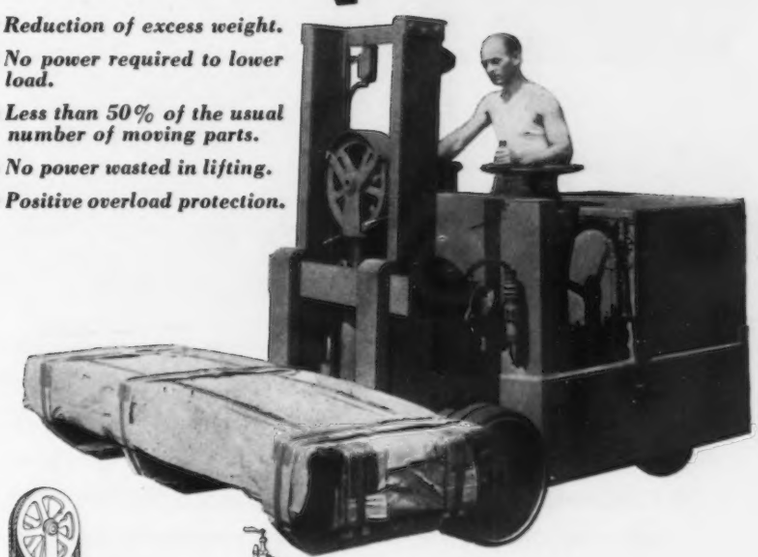
• • • **The first award** of the Army-Navy "E" to a machine tool rebuilder was presented to the Simmons Machine Tool Corp., here, last week. More than a score of officers of the Army, Navy and Marine Corps were present, headed by Capt. E. D. Almy of the Bureau of Ships, and Lt. Col. S. L. Connor of Watervleit Arsenal. The colonel pointed out that Simmons had rebuilt "carloads" of tools which had been stored at the arsenal after the last war and permitted to rust away until 1938. John Phelan, a 14-year Simmons veteran, accepted the award for the company's employees. He delivered the day's most stirring speech in pledging the continued cooperation of labor in the battle of production.

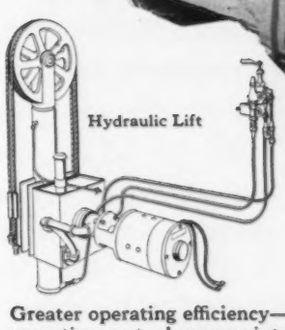

*Mercury pioneered and perfected*

THE HYDRAULIC LIFT

TO BRING YOU THESE 5 EXTRAS

- *Reduction of excess weight.*
- *No power required to lower load.*
- *Less than 50% of the usual number of moving parts.*
- *No power wasted in lifting.*
- *Positive overload protection.*






Greater operating efficiency—lower operating cost—lower maintenance cost, that's what the 5 extras of Mercury's Hydraulic Lift mean to you.

*Design Is Simple*: Heavy gear reduction units and gear cases common with the mechanical lift are completely eliminated. This means an important reduction in weight . . . less than 50% of the number of moving parts.

*Greater Economy*: The lift requires no power to lower the load—no power is wasted in lifting. Increased efficiency of as high as 25% in the overall elevating and lowering cycle.

*Overload Protection*: Relief valve provides complete overload protection at all times.

For the complete story on the Mercury Hydraulic Lift and Mercury Material Handling Equipment write for Bulletin 201-5.

*Mercury Pioneered and Perfected These Lift Truck Improvements:*

The Hydraulic Lift
Snap-Action Cam Operated Controller
Single Unit Double Reduction Drive Axle Assembly
All Welded Frame
Special Trail Axle Design

MERCURY MANUFACTURING COMPANY, 4144 S. Halsted St., Chicago, Ill.

• Tractors
• Trailers
• Lift Trucks

## A.S.T.E. Committees Now Organized on Area Basis

• • • **With an increase in membership** to almost 11,000 and the chartering of 16 new chapters during the past year, the American Society of Tool Engineers has been compelled once more to revise the representation system on its national committees, Otto W. Winter, president of the technical society has announced in naming new committee chairmen. To increase efficiency of operation and prevent the committees from becoming unwieldy, the 54 local chapters and 27 regions have been divided into seven area groups covering every section of the United States and Canada.

Earl V. Johnson, engineer, Firth-Sterling Steel Co., of Dayton, has been named chairman of the industrial relations committee whose primary project is a survey and compilation of a list of available tool engineering talent throughout the country. With each member chapter acting in its own territory, a confidential list of the tool engineers and production specialists is being gathered. This list will enable the industrial relations committee to assist the WPB, the War Manpower Commission and war industries generally on production engineering problems through consultation with local members of the society. Area vice-chairmen of the industrial relations committee are:

**New England**—W. W. Young, sales engineer, Pratt & Whitney Div., Niles-Bement-Pond Co., Cambridge, Mass.

**Middle Atlantic**—Thomas P. Orchard, supervisor, Jr. Tool Design (Tool Design Training School), Wright Aeronautical Corp., Paterson, N. J.

**Southern**—H. T. Sprott, assistant superintendent, Phillips & Buttorff Mfg. Co., Nashville, Tenn.

**Middle West**—Ernest H. Nieman, superintendent, Carter Carburetor Corp., St. Louis.

**Central**—G. J. Hawkey, president, Cleveland Duplex Machinery Co., Cleveland.

**Western**—Karl L. Bues, manufacturing engineer, Grove Regulator Co., Oakland, Cal.

**Canadian**—E. N. Wearn, superintendent, Canadian Acme Screw & Gear, Ltd., Toronto.

**E. W. Ernest, superintendent,** General Electric Co., Schenectady, and the A.S.T.E. representative on the American Standards Association as a member of the mechanical standards committee, heads the standards committee of the society. E. Griffiths, director of time study and methods of Westinghouse Electric & Mfg. Co., East Pittsburgh, is Mr. Ernest's alternate on the American Standards Association. Area vice-chairmen of the A.S.T.E. standards committee are:

**New England**—Leon F. Marsh, chief engineer, Abrasive Machine Tool Co., Warwick, R. I.

**Middle Atlantic**—F. J. Rawson, engineer inspector mechanical, National Bureau of Standards, Washington.

**Southern**—John H. Thomas, general foreman, gun erection, U. S. Naval Ordnance Plant, Westinghouse Electric & Mfg. Co., Louisville, Ky.

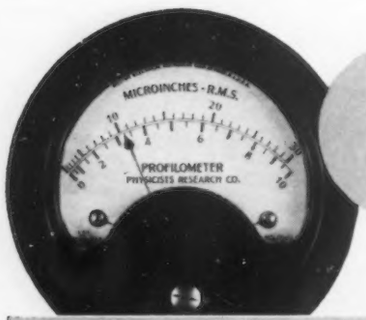
**Middle West**—Horace Wentzell, manager, Adams E.D.T. Co., South Bend, Ind.

**Central**—E. E. Griffiths, director time study & methods, Westinghouse Electric and Mfg. Co.

**Western**—Floyd A. Cox, tool design engineer, Solar Aircraft Co., San Diego, Cal.

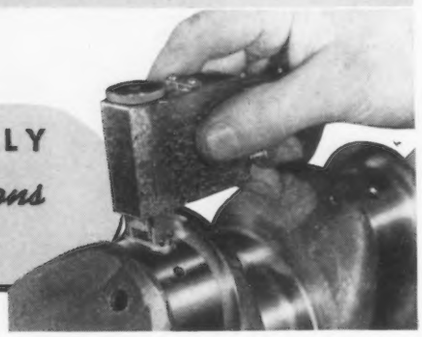
**Canadian**—Robert B. Douglas, superintendent, Propeller Div., Canadian Car & Foundry Co., Ltd., Montreal.

The new combined national Education and Training Committee which has the responsibility of advancing the society's extensive programs of industrial training and college curricula in tool engineering, is headed by President Winter, who prior to his election as head of the Society had taken the leading part in these projects.


The Surface Roughness Measurements YOU REQUIRE

SECURED DIRECTLY
...Without Computations or Scaling Methods



"Profilometer Readings" are accepted as the most accurate measurements of surface roughness which can be obtained. With the Profilometer,* they are secured *directly* merely by moving the Profilometer tracer over the machined surfaces of your parts. The instrument dial immediately gives the surface roughness rating in true inch units. There are no "in-between" steps . . . no computations or other scaling methods required.

In production and inspection departments . . . measuring surfaces of many sizes, shapes and degrees of roughness . . . Profilometers have found many uses. Special accessories and provisions for operating the instruments on AC circuits make them adaptable to widely varying needs. Write for full details.

*"Profilometer" is the trade name patented by Physicists Research Co.

The PROFILOMETER
PHYSICISTS RESEARCH COMPANY
343 SOUTH MAIN ST. • ANN ARBOR, MICH.

## COMING EVENTS

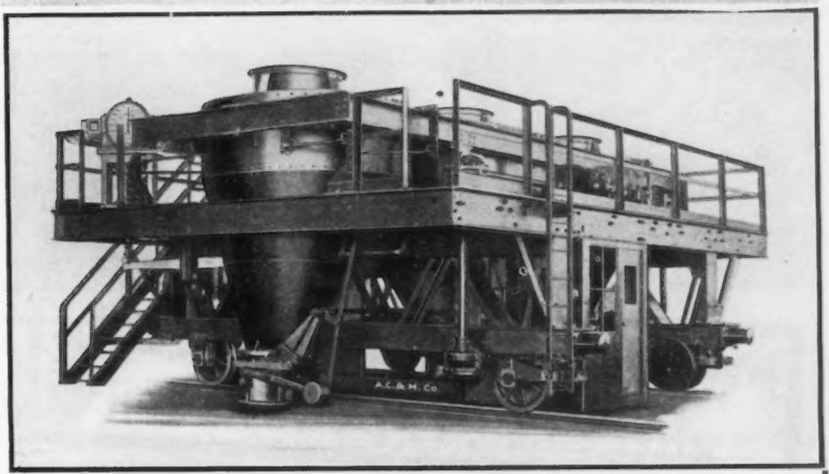
Sept. 1 to 11—Building and Construction Trades Council, Atlantic City.
Sept. 2 to 5—Roadmasters and Maintenance of Way Association of America, Chicago.
Sept. 22 to 24—Association of Iron and Steel Engineers, Buffalo.
Sept. 29 to Oct. 2—American Institute of Steel Construction, Colorado Springs.
Oct. 7 to 10—The Electrochemical Society, Inc., Detroit.
Oct. 12 to 16—National Metal Congress and Exposition, Cleveland.
Oct. 12 to 16—American Welding Society, Cleveland.
Oct. 12 to 16—American Institute of Mining and Metallurgical Engineers, Cleveland.
Oct. 15 to 17—Federation of Sewage Works Association, New York.
Oct. 16 and 17—War Production Conference of American Society of Tool Engineers, Springfield, Mass.
Oct. 18 to 21—American Public Works Congress, Chicago.
Oct. 19 to 23—Wire Association Meeting, Detroit.
Oct. 27-29—National Safety Congress Association, international convention, Chicago.
Nov. 17 to 22—National Chemical Exposition, Chicago.
Nov. 30 to Dec. 3—American Society of Mechanical Engineers, annual meeting, Hotel Astor, New York.
Nov. 30 to Dec. 5—National Exposition of Power and Mechanical Engineering, Grand Central Palace, New York.

This committee is the only one not set up on an area basis but is divided into a number of national sub-committees. The sub-committee chairmen are: Training Within Industry—Floyd W. Eaton, Training Within Industry Division, War Manpower Commission, Detroit; Apprentice Training—Ray Ellis, apprentice training director, General Electric Co., Schenectady; College Curricula and Emergency Training—John Younger, professor of industrial engineering, Ohio State University, Columbus; Tool Engineering Literature — Frank Martindell, engineer, Western Electric Co., Western Springs, Ill.; Vocational Education—O. F. Carpenter, associate district director, Training Within Industry Division, War Manpower Commission, Detroit; Visual Education—Roy E. Bender, education director, Thompson Products, Inc., Cleveland. Winter is vice-president of Republic Drill & Tool Co., Chicago.

The committtees on tool engineering literature is engaged in the task of reviewing the thousands of books related to tool engineering to establish recommended text material for training courses.

Robert M. Lippard, Heald Machinery Co., Worcester, Mass., is chairman of the national constitution and by-laws committee; W. B. Peirce, works manager, Flannery Bolt Co., Bridgeville, Pa., heads the membership Committee; Andrew E. Rylander, master mechanic and consulting engineer in charge of subcontracts, Midland Steel Products Co., Detroit, is chairman of the editorial committee; Roy T. Bramson of Detroit, publisher of the society's publication, "The Tool Engineer," has been retained by President Winter as chairman of the new chapters committee and Joseph A. Siegel, sales engineer, A. C. Haberkorn Machine Co., Detroit, is chairman of the publicity committee.


COKE OVEN EQUIPMENT



COAL CHARGING CARS

Atlas coal charging cars are preferred equipment on most ovens because they are designed to suit operating conditions exactly, and include those design features which insure dependable operation with low maintenance.

* * * * *

ATLAS COKE OVEN EQUIPMENT

Clay Carriers · Charging Cars : Door Machines
Coke Guides · Quenching Cars and Locomotives

The ATLAS CAR & MFG. CO.

ENGINEERS MANUFACTURERS

1100 IVANHOE RD. CLEVELAND, OHIO, U. S. A.

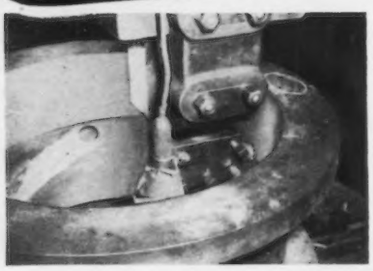
## $10 a Month Raise Granted Acme White Collared Workers; Retroactive to Feb. 8

*Chicago*

• • • **Earnings** of the salaried group of employees of Acme Steel Co. will be increased approximately $10 per month, according to an announcement made by Charles S. Traer, president. This action is in line with the recent wage increase granted hourly-paid Acme employees.

Made retroactive to Feb. 8, 1942, the advance in salaries affects all weekly and semi-monthly paid employees receiving $400 or less per month. Distribution of more than $160,000 in back pay for both the salaried and hourly paid workers was made on Thursday, Aug. 20. Many employees used the extra check for the purchase of war bonds.


KENNAMETAL* makes TOUGH Jobs EASY

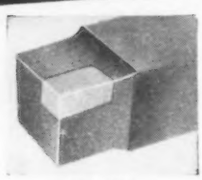


Machines Stellite Valve Seating Strips after ALL OTHER Tools Fail

Here is an excellent example of the versatility and efficiency of KENNAMETAL. The operation involved an interrupted cut in machining large valves and seats having stellite facing, and great accuracy was necessary so that the surfaces, when placed together inside the valve, would be leak-proof.

The job was so difficult for ordinary tools that the manufacturer seriously considered giving it up altogether. KENNAMETAL, however, machined these pieces at 30 ft./min. on both the lathe and boring mill, with feed of .012" to .015" per rev. and cut depth of 1/32" to 1/16". An excellent, smooth finish was obtained.

KENNAMETAL is constantly making similarly tough jobs easy, machining steels of hardnesses up to 550 Brinell at economical high speeds and feeds, taking jump cuts with no tool breakage. Find out what this superior carbide material can do for you . . . write for complete details.



STYLE NO. 3

STYLE NO. 11

HOW TO TAKE CARE OF KENNAMETAL

*Run at Proper Speed*

KENNAMETAL tools operate more efficiently at speeds at least double those of high speed steel tools on similar work. Don't run KENNAMETAL too slow.

KENNAMETAL THE All American CARBIDE

*INVENTED AND MANUFACTURED IN U. S. A.

McKENNA METALS Co.

144 Lloyd Ave., LATROBE, PA.

Foreign Sales: U. S. STEEL EXPORT CO., 30 Church St., New York (Exclusive of Canada and Great Britain)


## MacDonald Named Alternate For Hook on Scrap Committee

*New York*

• • • **J. Carlisle MacDonald,** assistant to chairman, United States Steel Corp., has been named alternate for Charles R. Hook, president, American Rolling Mills Co., on the American Industries Salvage Committee. Mr. Hook was unable to serve because of his trip to England on the special steel mission.

## Ore Movement Started From Southern Minnesota

*Minneapolis*

• • • **The first** shipment of iron ore from the Spring Valley area in Southern Minnesota was reported recently. The ore was shipped to East St. Louis, Ill. The ore is moved from the stripping pits to a newly erected washing plant by motor trucks, by rail from the washing plant to the blast furnaces.

## Guards Watch Ore Facilities

*Madison, Wis.*

• • • **Two companies** of state guard troops have been ordered to guard the ore loading facilities at Superior and Ashland, Wis. Governor Julius P. Heil, in ordering out the guard, said that if the Superior and Ashland docks were destroyed the war effort would be greatly hampered.

## *Trade Notes . . .*

**Production Devices, Inc.,** has moved its headquarters from East Hartford, Conn., to its new plant at Poultney, Vt.

•

**Stran-Steel Division,** Great Lakes Steel Corp., has moved its Detroit office to the Penobscot Building.

•

**Aluminum Ladder Co.,** Tarentum, Pa., has moved its plant to Worthington, Pa., to buildings formerly operated by the Buffalo Woolen Mills.

•

**Acme Machine Tool Co.,** Cincinnati, has appointed the following sales representatives: Lynd Farquhar Co., Boston, to cover New England; Rudel Machinery Co., New York, to cover eastern New York and northern New Jersey; C. H. Briggs Machine Tool Co., Inc., Syra use, to cover central New York and northeastern Pennsylvania; George Keller Machinery Co., Buffalo, to cover western New York.

## 1000 War Posters Are Shown by General Motors

*Detroit*

• • • **Gathered from numerous** sources, more than 1000 colorful and stirring war posters from many lands and dating back to the Spanish-American War, are to be placed on exhibit by General Motors Corp., beginning Sept. 1.

The collection includes numerous rare poster collections loaned by individuals and organizations, the original art work for six outstanding Russian posters, and a prominent spot will be devoted to Chinese posters and posters from other United Nations.

Supplementing the poster display will be two large oilpaintings telling in vivid and authentic detail, the story of the peaceful Czech-Slovakian village, Lidice.

## Kid Scrap Drive Planned; 30 Million Eligible as Helpers

*Washington*

• • • **More than 30 million** boys and girls of school age will be eligible for admission to the junior salvage corps which begins operations Oct. 5. Membership is voluntary and operations will be confined to the home front. A house-to-house canvass will be made and the youngsters will dig out and turn in, or will report the presence of every ounce of neighborhood scrap in the country if present plans are successful.

KID SALVAGE

V-118 Drawn for Office of War Information

## Tennessee Breaks Records

*Birmingham*

• • • **Tennessee Coal, Iron and Railroad** Co. in July broke production records in red ore and stone; in coke and pig iron at Fairfield, as well as in plates, merchant mill and bar and structural mill products.

## Inland Makes Plate Record

*Chicago*

• • • **Plate shipments** at Inland Steel Co. for July were three times that production for the heaviest month in 1941. Shipment of plate from the company's 76 in. mill in July were up 178 per cent over any month in the immediate pre-

Brad Foote

SPECIAL CUT GEARS
SPEED REDUCERS

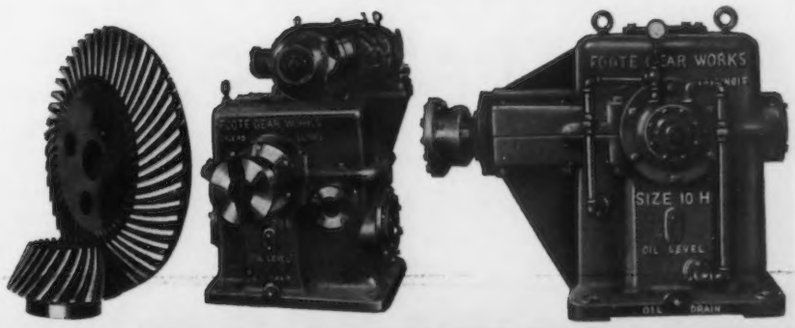
The Brad Foote plant, one of the most important production units of its kind is equipped to manufacture precision cut gears or speed reducers in any size or ratio.

Its record of accomplishment in the field of geared reduction over the years and the high standard of quality maintained are a guarantee of maximum service in the future.

GEARS
IMMEDIATE SHIPMENT

We have on hand subject to prior sale, Spur, Change, Bevel, Mitre, Worm & Worm Gears in sizes 3 to 20 pitch.

*For all dimensions send for Bulletin No. 111.*




BRAD FOOTE GEAR WORKS
1301 S. CICERO AVENUE • • • CICERO, ILLINOIS

## Denied Pay Raise, Workers Block "E" Award Ceremony

*Kearny, N. J.*

• • • **For the first time** in World War II's history the employees of a company are repudiating an Army-Navy "E" award. According to Walter Snell, treasurer of the Western Electric Employees Association, an unaffiliated union having some 22,000 members, the union does not believe that the Western Electric Co. has actually earned the award. As a result, he asserted that the union would not take any official part in the ceremonies. The union's grounds were, specifically, that the company had not met the Army and Navy requirements in connection with effective management and maintenance of fair labor standards. A recent WLB decision denied the workers a general 10c. wage increase. In consequence, the company has canceled the entire ceremony, according to R. F. Clifford, works manager.


Ask MEAKER!

Equipment for

GALVANIZING
(Electro Process)
PICKLING
CLEANING
PLATING

At your Service . . . the country's leading practical plating engineers.

ADDRESS:
The MEAKER co.
1635 So. 55th Ave., Chicago


## Production Resumed 5 Days After Stack Was Damaged

*Chicago*

• • • **Less than five** days after it was blown down in a 64-mile per hr. windstorm, a 125-ft. open hearth stack at the Gary Works of Carnegie-Illinois Steel Corp. was put back into service and operation of the steel foundry resumed. The huge stack from the steel foundry open hearth crashed into the core room on Aug. 22 during a windstorm, killing three men and injuring others.

As soon as the injured had been taken care of, men were put to work cleaning up the damage and preparing for a new stack. Simultaneously, a duplicate stack was shipped in sections by truck from the company's Joliet works to the Gary plant. As soon as the sections of the 50-in. stack were in place, it was bricked up. By the afternoon of Aug. 25 the erection of the new stack was completed and work in the foundry was resumed.

•

## Scrap Firm Enjoined

*Cleveland*

• • • **The Osgood Co.** of Marion, Ohio, has been restrained from the federal court here from purchasing iron and steel scrap at prices above OPA ceilings. The court found that the company's violations were not "willful." Meanwhile, the OPA will continue its inquiry into the operations of five Ohio dealers and brokers said to have sold scrap to Osgood Co. The scrap concerns mentioned included Balka Iron & Steel Co., Alliance; Malo Bros., Marion; Marion Iron & Metal Co., Duverstein Iron & Metal Co., Dayton, and H. J. Hull & Son Co., Mt. Gilead.

•

*Pittsburgh*

• • • **M. K. Frank,** Pittsburgh scrap dealer, has been ordered to turn over his firm's books and records to the OPA, after losing an appeal before the U. S. Circuit Court of Appeals. In addition, Mr. Frank and his business manager, M. I. Fruchs, were ordered to appear before the OPA for oral examination, but an appeal has been made against this part of the ruling and a hearing has been scheduled for Sept. 9 in Philadelphia. The OPA acted on a report that Frank quoted $40 a ton for relaying rails to a Texas steel concern.

# Quota Allocation System To Divide Steel Production

*Washington*

• • • **To be put into** effect soon, is the new quota allocation system, a WPB method for the distribution of steel. This plan is an adjunct to the quota assignment system which directs production of the mills.

The new plan will direct distribution of iron and steel on a quarterly basis, dividing production up according to the requirements of the Army, Navy, Lend-Lease, Board of Economic Warfare, Maritime Commission, and civilian supply.

Each bureau participating in the plan will distribute what are to be known as "steel certificates" upon application, and will notify WPB daily of the amounts of metal authorized to be purchased. WPB will keep a tight rein on allotments so that they are not exceeded and so that demand and supply are equalized.

Purchasers, according to the plan, are divided into two classes. Class I purchases are those who can identify their needs with a specific contract or authorization for military or essential goods. Class II purchasers are those who cannot so identify their needs. The agencies have jurisdiction over the approval of applications of Class I purchases or purchasers and WPB will be able to grant metal to Class II purchasers with the approval of the war agencies.

Steel certificates will show the month in which shipment is required. Production urgency is denoted by the certificate. If marked "C" first priority, "D" second priority, or "X" last priority.

"C" certificates are to represent 85 per cent of production, "D" certificates, 15 per cent of production, and "X" certificates up to 10 per cent overage.

•

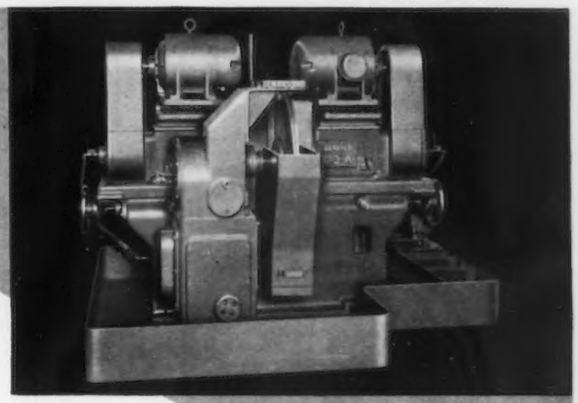
## WPB Levels Ceiling Over Priorities; Matches Demand

• • • **WPB, on Monday,** announced that it has put a ceiling over priorities, gearing supply to requirements in the processing of PD-25A applications. This patching of PRP was reported in the Aug. 13 issue of THE IRON AGE, Page 104A, in which it was stated that WPB officials intended to stop the blind paring of requirements by WPB analysts and match supply with demand.

WPB also shut the barn door on material "leaks." These were caused by unrecorded and equally blind priority assignment by the armed services, as THE IRON AGE has pointed out. Service procurement officers in the field, it is reported, will be obliged to get WPB regional office approval before preference ratings may be given. Likewise all PRP processing done by the various service branches, such as aircraft, ordnance, etc., will be obliged to submit their priority assignments to the WPB review and approval section.

But for this victory, it appears WPB has given up the PRP processing of companies whose production is 100 per cent military. Various units of the Army and Navy munitions board staff, though will be treated by WPB just like industry branches and will be limited by the determinations of the WPB requirements committee exactly like the WPB industry branches.

The new "overall" program described in the WPB press state-

*Grinds 25 grids in 1 minute!*

ON literally dozens of parallel-surface parts, that EXTRA speed in production which is so vital today, is being delivered by GARDNER DOUBLE GRINDERS.

For Double Disc Grinding is the natural method on such work; on ball and roller bearing races, roller bearing rolls; on small gun parts; on bomb release triggers; on torpedo fuse plates; on airplane nuts — on any piece with opposed parallel faces, the areas of which are not too large. It's the natural method because it permits grinding both faces simultaneously, thus doubling production over single-surface grinding.

TAKE a look at the record on the job illustrated here; malleable iron grids, ground at 20 TO 25 PER MINUTE, holding the parts within .002" for parallelism, and .004" to .006" for uniformity.

*For those parallel-surface jobs, investigate GARDNER-GRINDING*

WRITE TODAY FOR DETAILS!

GARDNER MACHINE COMPANY
412 East Gardner Street,
Beloit, Wis., U. S. A.

**PRIORITIES**
**-as well as clouds, CAN HAVE A SILVER LINING!**

• Now that chrome vanadium steel may be used only for certain specialized and limited purposes scores of manufacturers face the problem of replacing their springs with readily obtainable materials.

Holly can help you. Show us your drawings and we will tell you promptly what changes in design—if any—will be necessary to give you as completely satisfactory and *even better performance* at lower cost.

**Write, wire or better still . . . phone us!**

**AMERICAN SPRING OF HOLLY, INC.**
HOLLY, MICHIGAN



ment amounts to an explanation of the original WPB aims in processing PRP applications set forth in previous WPB publicity. The statement says that "for the third quarter, therefore, preference ratings were assigned and delivery of material was authorized in accordance with the priority pattern of the orders on each producers books."

## A. S. & W. Charged with Cable Price Violation

*Washington*

• • • **The American Steel** and Wire Co., which has been charged by a Federal grand jury with violation of Federal law in connection with the sale of patented insulated cable to the Navy, on Monday released the following statement:

"On Nov. 15, 1933, the American Steel and Wire Co. took a license from Rockbestos Products Corp., to manufacture and sell a special type of patented electrical cable. This license agreement, until amended June 29, 1942, contained a clause which provided that the wire company was required to observe the prices established by Rockbestos on all sales.

"The wire company complied with this agreement in good faith, and charged the prices named by Rockbestos, in the belief that this was entirely legal."

•

## Tungsten Ore Control Relaxed For Beneficiating Purposes

*Washington*

• • • **Tungsten ores** or concentrates may be delivered by any producer, dealer or processor to dealers or processors for the purpose of being concentrated or beneficiated, without specific authorization by WPB, it was announced on Aug. 18 with the issuance of Amendment No. 1 to General Preference Order M-29, as amended June 30.

The amendment also extends to 120 days the period during which dealers may hold stocks of tungsten ores and concentrates acquired under the terms of this order. The original order specified 60 days, but this was found to work a hardship on smaller dealers. The purpose of this provision is to prevent accumulation of idle inventories of the critical metal.

**Delivery without** specific authorization by WPB was restricted by M-29 to ores and concentrates containing 20 per cent or less of tungsten trioxide. Because the amendment permits movement without specific authorization from producers, dealers or processors to concentrators. Control over tungsten is exercised by WPB when delivery is made to consumers.

•

## Office Machinery

• • • **An official** interpretation which formalizes a practice developed by WPB's services branch in its administration of office machinery order L-54-c was announced Aug. 19. The interpretation makes it clear that deliveries to "cost-plus-fixed-fee" contractors working on Army, Navy or Maritime Commission orders must be authorized in one of two ways, depending on the use to which the machine will be put.

When an order is placed by one of these contractors to be installed by him and used by one of the three services (on a ship, for instance), authorization to deliver must be secured by the manufacturer or distributor on Form PD-423. If, however, the contractor wishes to purchase office machinery for his own use in the performance of his contract his purchase order must be accompanied by a preference rating on Form PD-1A.

•

## Cobalt for Ground Frit

• • • **Amendment No. 2** to Conservation Order M-39-b, issued last Friday by WPB's Director General for Operations, limited the use of cobalt for ground frit, in any one quarter to 35 per cent of the amount used in the first six months of 1941.

Amendment No. 1 to this order, issued June 6, provided that when cobalt-nickel oxide could not be separated into its component metals, it might be used for ground coat frit without restriction. Experience with the operation of the amended order shows that persons using the oxide were not making a genuine effort to separate the cobalt and nickel.

Last week's amendment places ground coat frit in the same class with all products not specifically

mentioned in the order, the restriction being the 35 per cent mentioned above.

•

## Heat Treating Equipment

• • • **Heat treating equipment** was placed under tighter control of WPB by Order M-211, which authorizes establishment of production and delivery schedules. Where schedules are established by the WPB, they are to be maintained without regard to any preference ratings assigned to particular contracts, commitments or purchase orders.

•

## Saw Blades

• • • **Sale and distribution** of metal cutting band saw blades and hack saw blades will be limited to consumers with preference ratings of A-9 or higher, under order E-7, issued Aug. 22. The order is effective Aug. 31, and excepts only hand-frame hack saw blades made of low-grade steel and stock in the hands of small retailers on Aug. 31 when the total value of such stock is $50 or less. The order applies to all purchase orders now on the books and applies not only to manufacturers, but also to all persons selling blades. It does not, however, apply to sales or deliveries among retailers, distributors or manufacturers who are purchasing for resale and not for use. Hack saw blades excepted were described as those not more than 0.025 in. thick and not more than 12 in. long containing no alloys.

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## Detinned Scrap

• • • **At the request** of ODT's Division of Rates, the Western and Southwestern railroads, cooperating with Central Freignt Association lines, reduced the rates on detinned scrap to 22.5 per cent of the first-class interterritorial rates, subject to a minimum carload weight of 30,000 lb., from points in the West and Southwest to Pittsburgh, Pa. A maximum rate of 75c. per hundred lb. from any point of origin in the areas concerned to Pittsburgh was set.

This figure was set as the maximum which would permit economical detinning. The movement of such salvage over long distances is a new one, resulting largely from the establishment and enlargement of army camps at western and southwestern points. A corresponding rate reduction had previously been effected for shipment of this class of scrap to the Chicago area.

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## PRP Administrator Named

*Washington*

• • • **Raymond Hart,** New York, has been appointed to the staff of A. I. Henderson, WPB deputy director general for Industry Operations, to be in charge of PRP operations within the industrial and commodity branches of WPB.

•

## Fitzhugh New Container Chief

• • • **W. W. Fitzhugh** has been appointed assistant chief of WPB's Containers branch in charge of package revision. All applications for preference ratings for new machinery installations or for the development of existing installations relating to package revision will be reviewed by his staff. Mr. Fitzhugh for the past year has been chief of the Folding and Set-Up Box section. He is president of William W. Fitzhugh, Inc., New York, manufacturers of labels and folding boxes.

Franklin R. Kelley, Philadelphia, former consultant in the Folding and Set-Up Box section, becomes acting chief of the section.

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## WPB Names Information Head

• • • **Stephen E. Fitzgerald** has been appointed director of WPB's Division of Information. Mr. Fitzgerald was chief of the Production Branch in the former OEM Division of Information. Since the recent reorganization of the information agencies he has been acting head of WPB's information office. He was a former special writer for the *Baltimore Evening Sun.*

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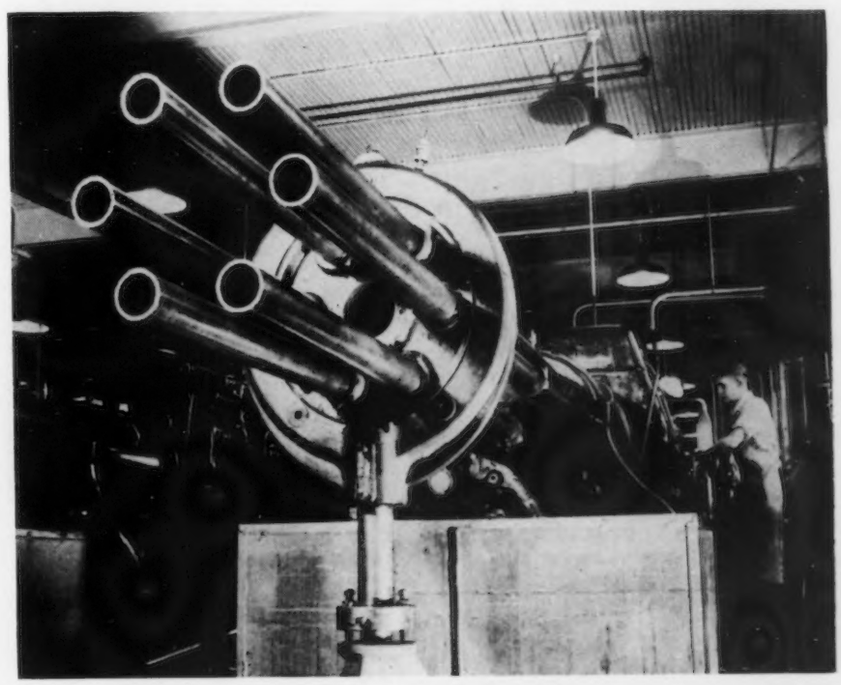
## Chemicals, Refractory Brick Exempted from Current PRP

• • • **PRP units** are given permission to purchase a number of commodities in greater quantities than those authorized on their PRP certificates by Exemption No. 2 to Priorities Regulation No. 11, issued Aug. 20.

Materials chiefly affected by the exemption are chemicals, which

**BUSINESS END: No super-gun at all . . . you are looking at the charging end of a multiple spindle automatic screw machine which performs operations on shell bodies in a converted cash register factory. Because of its appearance this machine is earning the name of "Gatling Gun."**



were omitted from the materials list of the fourth quarter PD-25A. Among other material exempted from PRP restrictions are those exempted from inventory restrictions by order M-161. This material includes refractory brick, bulk salt, caustic soda and soda ash. Other items that may be added to M-161 will also be exempted from the quantity limitations imposed by the PRP certificate.

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## Price Formula Set by OPA For Fabricated Structurals

*Washington*

• • • **The formula** for determining maximum prices for fabricated structural steel shapes, plates and bars and the service of fabricating these products when such prices cannot be established under section 2 of the GMPR, was announced last week by the OPA. The formula is contained in order No. 61 under section 3 (b) of the GMPR, and became effective Aug. 20.

It directs that when a seller cannot determine his maximum prices for sales of fabricated structural steel shapes, plates and bars (or for the service of fabricating these items) under section 2 of the general regulation, he shall calculate his ceiling price by using the same methods he would have used in March, 1942.

In calculating such a price the seller is required to employ the same cost factors (wage rates, prices of materials and overhead) which were then in effect, and the same mark-up or margin over the March costs he would have then included on an identical sale.

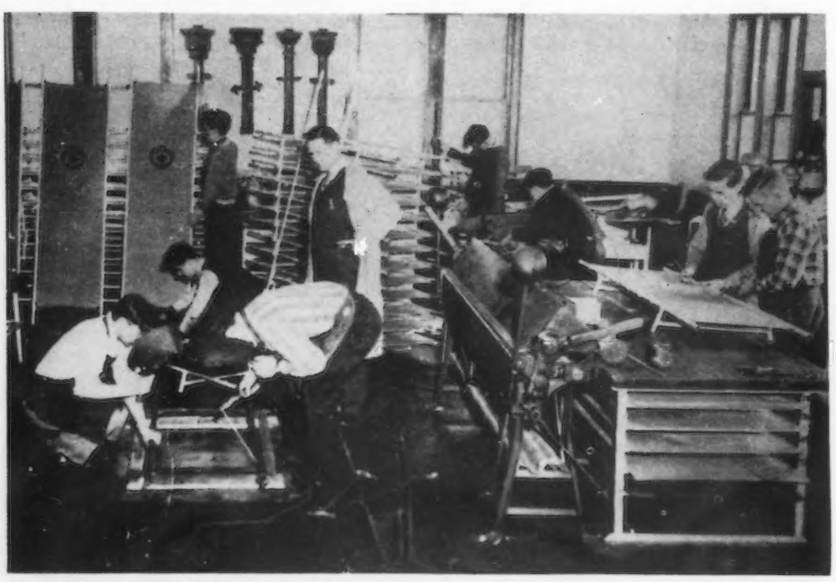
Order No. 61 provides that sellers may use this method for determining maximum prices without waiting to secure authorization from OPA.

As a safeguard against excessive prices, however, the order provides that the seller must report to OPA each month sales totaling $5000 or more.

## 1-Hour Strike Halts C-I Strip Finishing Dept.

*Pittsburgh*

• • • **A flash strike** involving 300 employees stopped production for an hour in the hot strip finishing department of the Irvin works of the Carnegie-Illinois Steel Corp. The men agreed to submit their grievances to regular union machinery set up for the handling of such matters, after having stopped work for an hour.



**STRETCHERS FROM SCRAP: This welding class in an Ohio community has made 90 stretchers for various first aid agencies, using scrap metal pipe. The stretcher's weight of 25 lb. is composed primarily of ¾-in. pipe. Photograph courtesy of Hobart Brothers, Troy, Ohio. (Even the activities of war workers in training are used to swell U. S. production. This Ohio plant is only one example of full utilization of the energy of American workmen.)**

## G. M. Reaches New High In Production of War Material

*Detroit*

• • • **During the** month of July, total value of deliveries of war materials from the plants in the United States and Canada of the General Motors Corp. was $156,892,348, up $14,291,284 from June. For the first seven months, the value of the GM deliveries of war materials totals $785,331,500.

A summary of deliveries is as follows:

1942 MONTHLY

| | |
|---|---|
| January | $ 78,048,424 |
| February | 84,084,535 |
| March | 95,346,412 |
| April | 110,026,601 |
| May | 119,332,116 |
| June | 141,601,064 |
| July | 156,892,348 |
| 1942 to date | $785,331,500 |

1941-1942 QUARTERLY

| | | |
|---|---|---|
| 1941 | First quarter | $ 56,619,168 |
| | Second quarter | 75,180,914 |
| | Third quarter | 115,879,493 |
| | Fourth quarter | 158,469,698 |
| 1942 | First quarter | 257,479,371 |
| | Second quarter | 370,959,781 |

## New Steel Handbook For Machine Tool Users

• • • **The fifth edition** of "Steel Handbook No. 42 for Machine Tool Users" has just been issued by Republic Steel Corp., Cleveland. A timely feature is a listing of American Iron and Steel Institute and SAE standard steels, with suggested speeds and feeds for machining many of these steels with standard tools on automatic screw machines. Another section contains 15 pages of data on the various cold finishing processes, giving tolerances, size lengths and other related information. The new pocket size book contains 84 pages, thumb indexed.

## Ratings Lifted for Machine Tool Plants

*Cleveland*

• • • **Machine tool builders** here have received wires from Emery Houghton of the WPB authorizing them the use of AA-1 to AA-4 priorities for 95 per cent of their material requirements, as against their previous rating under PRP giving them AA ratings for only 50 per cent of their needs. The telegrams apparently were in response to appeals by machine tool builders that operations would be severely hit unless priority relief is granted.

# This Week's Priorities and Prices

**Bituminous coal** prices for delivery from mine or preparation plant are adjusted by Amendment No. 17 to Maximum Price Regulation 120, effective August 22. (OPA-535)

**Structural steel shapes,** plates and bars may be priced according to a formula established in Order No. 61, under Sec. 3 (b) of the General Maximum Price Regulation. (OPA-546)

**Band saw** and hack saw blade sale and distribution is limited to consumers with ratings of A-9 or higher by Order E-7, issued Aug. 22. (T-754)

**Heat treating equipment** is placed under tighter control by Order M-211 issued Aug. 22, which authorizes WPB to establish production and delivery schedules. (T-755)

■ ■ ■

*For copies of above announcements address Office of War Information, Washington, giving announcement number as shown in parentheses after each paragraph. (For example,* WPB-600 *means announcement* 600 *issued by the War Production Board.)*

• • •

# Revisions to The Iron Age Priorities Guide

**• • • The following data, together with all intermediate weekly revisions in THE IRON AGE, should be added to THE IRON AGE Priorities Guide published with the issue of June 4 to bring the Guide up to date.**

**M Orders:**

M-1-e...**Superseded by M-1-i (8-19-42).**

M-1-f...**Superseded by M-1-i (8-19-42).**

M-1-i...Restricts less essential military uses of aluminum. Revokes orders M-1-e and M-1-f (8-19-42). Related form: PD-26.

M-29...Amendment No. 1 (8-18-42) permits tungsten ores or concentrates to be delivered to processors and dealers for concentration without restriction.

M-211...Authorizes WPB to establish production and delivery schedules of heat treating equipment (8-22-42).

**P Orders:**

P-118...Interpretation No. 1 (8-17-42) states that preference ratings for repair, maintenance, operating and replacement materials are available only for the primary processing phases of manufacturing dairy products.

**L Orders:**

L-54-c...Interpretation No. 1 (8-18-42) authorizes manufacturer of office machinery to make deliveries to contractors to fill orders for armed forces. Related forms: PD-1A and PD-423.

L-161...Prohibits use of copper or its alloys in the manufacture of parts for fuses other than current-carrying parts. (8-24-42)

**Priority Regulations:**

Priorities Regulation No. 11...Exemption No. 2 (8-20-42) states that fourth quarter PRP reports will not be required to include chemicals, but companies will be permitted to utilize PRP for them if desired.

**E Orders:**

E-7...Limits sale and distribution of metal cutting band saw blades and hack saw blades to consumers with preference ratings of A-9 or higher (8-22-42).

## Use of Aluminum Restricted Further

**• • • In an effort** to provide adequate supplies of aluminum for implements of war, the WPB last week issued Supplementary Order M-1-i, revoking orders M-1-e and M-1-f, and consolidating their provisions, with changes, in a combination conservation and use-control order. By restricting some less essential military uses, the order will insure adequate supplies for combat items, WPB states.

In consolidating the two previous orders, today's order makes several important changes in aluminum control. The principal changes are:

1. Aluminum for the armed forces is limited to "implements of war." The order defines these as ". . . combat end-products for field or combat use . . ." Further, aluminum may be used here only to the extent and in the grade required by the latest issue of specifications of the purchasing agency. The earlier order permitted use of any aluminum specified in Army and Navy orders. A 90-day exception for the services to meet this restriction is granted in the new order.

2. "Low-grade" aluminum, which is the only aluminum permitted for certain purposes, is defined as aluminum containing more than 4 per cent copper and either iron or zinc in excess of 1 per cent.

3. Procedure for applying for allocations of aluminum is formalized under the order. All requests for allocation of "eligible" items, as listed in the order, are to be made on Form PD-26. Requests for allocation of aluminum for purposes not "eligible" are to be made directly to the Aluminum and Magnesium Branch, WPB, by the manufacturer who wishes to use the aluminum. If approved, the order may be accepted by the fabricator of aluminum.

4. Use of aluminum in alloys, other than zinc alloys, is limited to a maximum of 15 per cent in any one alloy, and a maximum average of 12 per cent of aluminum in any one month. The former order did not limit aluminum content of specific alloys.

5. Aluminum for carbometer wire is added to the list of eligible uses. This wire is used for testing in steel manufacture.

6. Aluminum for essential chemical plant equipment may now be allocated only if the purchaser submits proof of his need for aluminum to WPB.

7. Procedure for obtaining aluminum for plant maintenance and repair, where no substitute is practicable, is clarified.

8. Core boxes and core dryers are added to the list of uses eligible for low-grade aluminum.

9. Another important change is the addition of certain portable electric tools to the list of uses eligible to receive low-grade aluminum. This provision was inserted because experience proved that some portable tools would cease to be portable if they had to be made entirely of heavier metals. Frequent appeals were made under the old order, and today's change will permit, with careful restrictions, the necessary use of aluminum in these essential tools.

daily rated capacity of 1050 net tons, although current emergency will probably witness the above-capacity operation of this furnace from time to time. The old furnace had a 750-net ton daily rated capacity with an 18 ft. 6 in. hearth diameter and a 22 ft. 6 in. bosh diameter, while the thickness of the lining was 2 ft. 7½ in. and the height of the furnace was 88 ft. ½ in. The new furnace has a height of 100 ft., a 4-ft. lining thickness, a 23 ft. hearth diameter and a 26 ft. 6 in. bosh diameter.

**The new furnace** has a double skip hoist instead of the single skip feeding the old furnace and will have 14 tuyeres against 12 for the old furnace. The old stoves have been adjusted by the use of checkers so that they will have a heating surface of 120,000 sq. ft. each, which is almost three times the heating surface of the old stoves before adjustment.

## Steel Production Up 6 Months' Earnings Drop

• • • **Net earnings** for the first half of 1942, analyzed from the reports of 72 companies representing approximately 90 per cent of the steel industry, show a sharp drop to the lowest figure since the first half of 1939, according to the American Iron and Steel Institute. This occurs in spite of the fact that steel production is at an all-time high and reflects in an average earning rate of 5.3 per cent for the half, down fully a third as compared with 8.1 per cent earned in the same period in 1941. Principal factors affecting the decrease in earnings have been increased taxes, payrolls running up to 30 per cent higher and certain increases in operating costs. Net income of the 72 companies, after paying taxes and other obligations, was $116,407,000 for this half compared with $167,421,000 in the first half of 1941.

## Pontiac Cannon Output Climbs

*Detroit*

• • • **Pontiac Motor** Division's production of 20 mm. anti-aircraft cannon over the last six months merits the addition of a star to the division's Navy "E" burgee, the division was informed. Pontiac last January was the first car manufacturer to receive the Navy award for production of war material. The additional star is believed to be one of the few awarded in the Middle West.

## Shipbuilding Goal Likely to be Broken

*Washington*

• • • **Evidence** that President Roosevelt might have set his shipbuilding goal even higher than 8 million dead weight tons was seen in the recent statement of WPB to the effect that the Maritime Commission's schedules had been boosted to nearer 9 million tons and that ships' plate was on hand or available for most of this tonnage. July bore out this presumption by being the third successive record-breaking month with a mark of 71 completed ships totaling about 790,000 tons. Speculation points to an increased output of around 10 per cent for the year.

## New Plant Additions Reach 50 Million in Chicago Area

• • • **New industrial plant** and additions to existing factories authorized in the Chicago area during the pats month have involved an investment of $49,479,000, Leverett S. Lyon, chief executive officer of the Chicago Association of Commerce, reports.

## *Average Earnings for Steel, Other Workers*

***(For second quarter of 1942)***

| INDUSTRY | Average Weekly Earnings | | | Average Weekly Hours* | | | Average Hourly Earnings* | | |
|---|---|---|---|---|---|---|---|---|---|
| | June | May | April | June | May | April | June | May | April |
| Iron and Steel and their products | $39.84 | $39.63 | $38.99 | 42.6 | 42.6 | 42.2 | 93.7c | 93.3c | 92.6c |
| Blast Furnace, Steel Works, Rolling Mill | 40.85 | 40.91 | 40.22 | 40.8 | 40.9 | 40.4 | 99.9 | 100.0 | 99.6 |
| Bolts, Nuts, Washers, etc. | 39.50 | 40.31 | 39.68 | 45.1 | 45.7 | 45.8 | 88.0 | 88.2 | 86.6 |
| Cast Iron Pipe | 34.08 | 32.77 | 31.82 | 43.8 | 43.1 | 42.6 | 77.0 | 75.7 | 74.5 |
| Forgings, Iron & Steel | 50.51 | 51.05 | 50.43 | 48.1 | 49.4 | 49.3 | 103.3 | 102.4 | 102.1 |
| Structural and Ornamental Metalwork | 41.63 | 41.14 | 40.85 | 46.0 | 45.7 | 45.7 | 90.8 | 90.3 | 89.4 |
| Tools (not including edge tools, machine tools, files, etc.) | 39.50 | 38.87 | 38.24 | 47.9 | 47.6 | 47.6 | 82.0 | 81.7 | 80.4 |
| Machinery | 46.01 | 45.38 | 44.56 | 48.1 | 47.8 | 47.5 | 95.2 | 94.2 | 93.0 |
| Agricultural Implements | 43.07 | 42.55 | 40.93 | 43.1 | 43.2 | 42.9 | 100.2 | 98.6 | 95.5 |
| Electrical Machinery | 42.62 | 42.21 | 41.80 | 46.4 | 46.0 | 45.8 | 92.6 | 91.8 | 91.3 |
| Engines, Turbines, etc. | 56.20 | 56.11 | 56.20 | 49.1 | 49.2 | 49.1 | 113.7 | 113.8 | 114.6 |
| Foundry and Machine Shop Products | 44.71 | 43.91 | 43.49 | 48.4 | 48.2 | 48.2 | 92.1 | 91.0 | 90.0 |
| Machine Tools | 52.47 | 52.24 | 50.79 | 53.8 | 54.1 | 53.9 | 97.4 | 96.5 | 94.4 |
| Textile Machinery | 40.86 | 40.49 | 39.55 | 49.3 | 49.4 | 48.9 | 82.8 | 82.0 | 80.5 |
| Transportation Equipment | 50.21 | 50.17 | 49.71 | 46.7 | 46.9 | 47.0 | 107.1 | 106.9 | 105.7 |
| Aircraft | 46.75 | 46.44 | 46.07 | 47.2 | 47.6 | 47.3 | 99.6 | 98.9 | 97.5 |
| Automobiles | 50.20 | 50.08 | 50.29 | 44.0 | 43.7 | 44.2 | 113.7 | 114.2 | 113.3 |
| Locomotives | 48.29 | 50.47 | 50.91 | 46.6 | 48.3 | 49.1 | 103.7 | 104.5 | 103.8 |
| Shipbuilding | 52.82 | 53.67 | 53.30 | 48.2 | 48.8 | 49.2 | 109.2 | 109.0 | 108.0 |
| Non-ferrous Metals | 41.17 | 40.53 | 40.01 | 44.6 | 44.2 | 44.2 | 92.3 | 91.1 | 89.7 |
| Aluminum Manufacturing | 40.71 | 41.46 | 41.36 | 44.1 | 45.1 | 45.0 | 92.9 | 92.2 | 92.1 |
| Brass, Bronze, Copper Products | 45.75 | 44.75 | 44.56 | 45.9 | 45.2 | 45.6 | 99.9 | 99.4 | 98.1 |

*Since not all firms furnish man-hour data, average hours and average hourly earnings are based on reports from a smaller number of establishments than average weekly earnings. (Figures are from the U. S. Department of Labor.)

## *Sheet & Tube Builds New Stack on Stilts While Old One Operates*

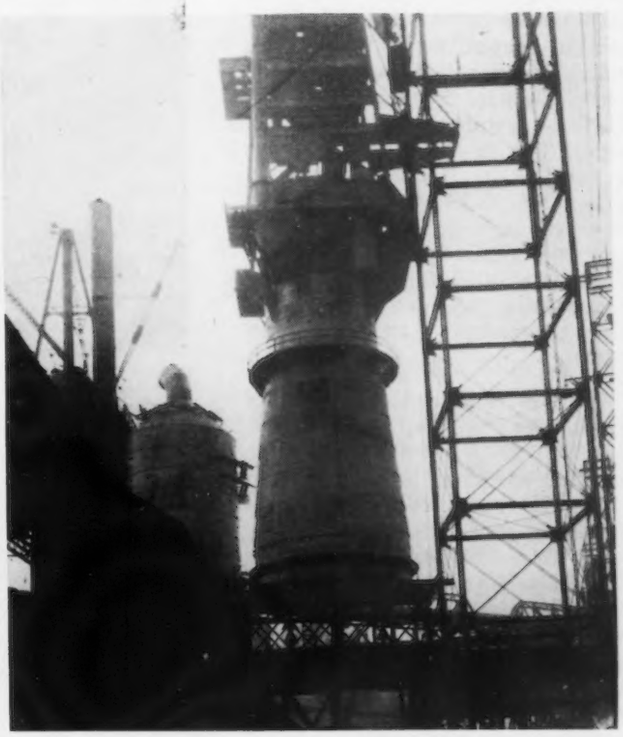
*Youngstown*

• • • **Youngstown Sheet & Tube Co.**, by using a new device in pre-constructing its new "D" blast furnace at the Campbell Works, saved approximately 90 days' pig iron production or about 94,500 net tons. If the company had used normal construction methods to dismantle and then rebuild its "D" blast furnace, the dismantling and rebuilding done consecutively would have required approximately 180 days. Instead, the company pre-constructed the steel shell on a trestle, with such construction work taking place while the old blast furnace was still in operation.

At the last possible moment the old furnace was blown out and dismantled, and as soon as the old structure was cleared away the new prefabricated furnace structure was moved into place on rollers riding on tracks, by means of winches and a heavy cable. In moving the 600-ton furnace a distance of 112 ft., a cable broke and several hours were required to replace it. Despite this, the delicate job involving the movement of the enormous structure costing some $1,500,000 for alinement near other blast furnace equipment costing some $25,000,000 was accomplished within a few days.

**The Eichleay Engineering** Corp., Pittsburgh, handled the moving of the furnace, which was constructed by the William B. Pollock Co., Youngstown, on the basis of Youngstown Sheet & Tube Co.'s own design.

The new furnace will probably be blown in some time before Oct. 1, 1942, whereas the old furnace was blown out on July 5, 1942. The new furnace will have a



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**STILT - MOVED STACK: To save time, Youngstown Sheet & Tube Co. built a blast furnace (top left photo), moved it 112 ft. (top right photo), and placed it on its permanent foundation (photo at right). This pre-fabricated furnace will begin melting in October, another illustration of a steel industry idea to speed war production.**

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# PERSONALS . . .

• **Edward F. Early,** superintendent of the Morgan Works of the Wickwire Spencer Steel Co., has been named general superintendent of the Worcester, Mass., District of the company. In the future, Mr. Early will have supervision over the Morgan and Goddard Works in Worcester and the Clinton, Mass., Works. Mr. Early's entire business career has been with Wickwire Spencer Steel Co. His first employment was as an errand boy in the Morgan Works in June, 1910. He was successively spring maker, transportation foreman, assistant foreman of the spring department, production clerk, wire mill foreman and assistant superintendent. He became superintendent of the Works in 1929.

• **William Heidgerd** will join the staff of the Parsons Co. of Detroit, and will be located at Traverse City, Mich., it was announced this week. His work there will be in connection with material procurement. Mr. Heidgerd has been associated with the Jones & Laughlin Steel Corp. for the past 15 years in various sales capacities in Chicago, Pittsburgh and Detroit. He resigned from the J & L Detroit district sales force to accept this new position.

• **Victor E. Williams,** assistant general manager of sales of the Organic Chemicals Division of Monsanto with headquarters in New York, has been promoted to the position of director of sales of the Organic Chemicals Division. **Frederick C. Renner,** assistant general manager of sales of the Organic Chemicals Division of Monsanto, has been named general manager of sales, with offices in St. Louis.

• **F. C. Todd,** formerly a member of the faculty of Pennsylvania State College, has joined the technical staff of Battelle Memorial Institute, Columbus, Ohio, and has been assigned to research in industrial physics.

• **William E. Vogt** has been elected secretary of Electro Metallurgical Sales Corp., a unit of Union Carbide & Carbon Corp., New York.

• **F. Ward Coburn,** heretofore vice-president and general manager of the E. & G. Brooke Iron Co., Birdsboro, Pa., has been elected president of the company, succeeding Robert E. Brooke whose death occurred on July 21. Mr. Coburn has been associated with the company since 1924 when he joined the organization as superintendent of the blast furnace, later being made general manager. He has been vice-president since 1937 and a director of the company since 1928.

EDWARD F. EARLY, general superintendent, Worcester District, Wickwire Spencer Steel Co.

F. WARD COBURN, president, E. & G. Brooke Iron Co., Birdsboro, Pa.

• **John Sramek,** who for the past seven years has been Pittsburgh manager for the Biddle Purchasing Co., has resigned to accept a position in the purchasing department of Dravo Corp.

• **E. C. Jennings,** manager of the order department, strip steel division of the Cold Metal Products Co., Youngstown, has been granted a leave of absence to accept a commission as lieutenant in the Coast Guard Service. **W. H. Rees,** formerly associated with Carnegie Illinois Steel, is now serving in Mr. Jennings' place.

• **John Munro** has been promoted to the position of vice-president, Whiting Corp., Harvey, Ill., in charge of a new procurement division which will take in purchasing, expediting, and priorities.

• **R. H. Langdon** has been appointed field engineer in the Pittsburgh district by Norton Co., Worcester, Mass., and **E. P. Gregory** has been appointed field engineer in the Chicago district.

• **E. Carl Soby** has been appointed vice-president in charge of gas utilities sales of the George D. Roper Corp., Rockford, Ill. For the present he will be part of the firm's war production program.

## Foundrymen to Use Local Men on Association Programs

*Birmingham*

• • • **With meetings** to be held once each month from October through May, officers and directors of the Birmingham District Chapter, American Foundrymen's Association have decided to invite only local men to speak on its programs, and that the organization will cooperate in a national association drive to raise funds for experimentation in foundry practices.

In discussing the plan to invite only men from this area to speak on chapter programs, Vice-Chairman Carson Adams said:

"There are numerous men in this district with enviable records in the foundry industry, and there is no reason why they should not speak to us. Previously we have invited many men from far-distant points as speakers, but in view of war conditions, we feel it wise to utilize our own local talent."

## A.S.T.E. Plans War Conference At Springfield, Oct. 16-17

• • • **Production problems** that have arisen in America's first nine months of the war and plans to solve the threatened bottlenecks in war industry due to shortages of critical materials, etc., will be discussed at the War Production Conference called by Otto W. Winter, president of the American Society of Tool Engineers at Springfield, Mass., Friday and Saturday, Oct. 16 and 17. Headquarters of the conference will be at the Kimball Hotel and representatives from industry covered by all the 54 chapters of the national technical society are expected to participate in the meeting.

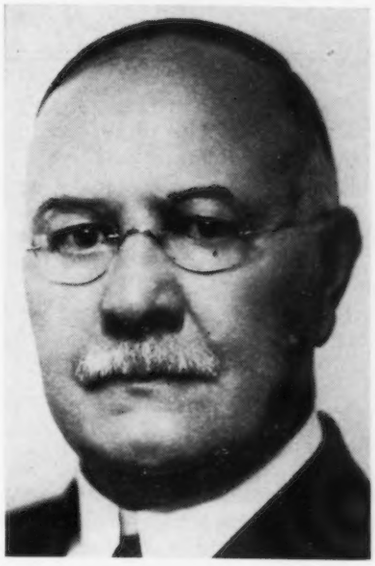
A conference on emergency training will open the session on Friday morning, followed by a session on inspection Friday afternoon and a discussion on tool conservation and salvage Friday evening. The Friday afternoon session will attempt to get a better relationship established between inspection specifications called for by the armed services and those normally employed in the manufacture of precision products, thus avoiding needless checking of details fundamentally not vital to the satisfactory operation of the product.

War tooling and conversion to war production will be discussed at the morning session on Saturday, the 17th, and a presentation and forum on material substitution has been scheduled for the afternoon conference. At the latter session, it is hoped information will be developed which will be of major usefulness to manufacturers of war materials in meeting shortages in vital war materials through the substitution of less critical material.

Frank W. Curtis, chief engineer, milling machines, Van Norman Machine Tool Co., Springfield, past president of the A.S.T.E., will be chairman of the conference, with the New England and Middle Atlantic states chapters acting as hosts to the national society. Serving on the Conference Committee are the chairmen of these fourteen chapters.

An exhibit of products manufactured in the northeastern states will be on display in the lobby of the hotel.

# OBITUARY . . .



**The late JOHN P. SYKES who had been senior vice-president and a director of the Baldwin Locomotive Works before his retirement in 1938. (Story in last week's issue.)**

• **Frederick Lee Stone,** vice-president and director of Universal Atlas Cement Co., United States Steel subsidiary, died at St. Mary's Hospital, Rochester, Minn., on Aug. 17, aged 66 years. Mr. Stone began his business career as a clerk in the New York Telephone Co. in 1894. In 1911 he entered the employ of the Universal Atlas Cement Co. as a salesman, advancing successively to chief clerk, assistant sales agent, division sales manager, assistant general sales manager, general sales manager until in 1932 he became vice-president of the company and in 1938 was elected a director.

• **Arthur E. Painter,** New York representative, Atlantic Steel Castings Co., Chester, Pa., died Aug. 14, aged 50 years. Mr. Painter had been associated with the steel foundry industry most of his life having been formerly with the Reading Steel Castings Co., Reading, Pa., Bayonne Steel Castings Co., Bayonne, N. J., and the Riverside Steel Castings Co., Harrison, N. J. He had been associated with Atlantic Steel Castings for the last 10 years as the head of its New York office.

• **Edwin H. Brevillier** died Aug. 10, aged 64 years. He had been president of Union Iron Works at the time of his death, having been elected to that office in 1941. Since 1934 he had been vice-president. He became associated with Union Iron Works in 1906, having previously been connected with the firm of Johnson and Brevillier.

• **Gordon Stoner,** vice-president and general manager of the Midland Steel Products Co. and a former professor of law at the University of Michigan, died Tuesday at Ann Arbor. He was 62 years old. He became assistant to the vice-president of the Detroit Pressed Steel Co. in 1918. From 1923 to 1926 he served as secretary of the Midland company, became its vice-president in 1926 and was made general manager in 1931.

• **Leonard Wesson,** operating manager, Universal Atlas Cement Co., United States Steel subsidiary, died Aug. 15, aged 65 years.

• **Norton A. Mears,** vice-president in Charge of Purchases, R.C.A. Mfg. Co., Inc., died August 19. Mr. Mears began his manufacturing career with the Lake Shore & Michigan Southern Division of the New York Central Railroad. He was in charge of time-study, rate-setting, and inspection departments of the agricultural implement plants of Sears, Roebuck & Co.; spent five years with Amalgamated Machinery Corp. as Assistant Manager at Chicago, and as Manager of its open-hearth steel plant at New Cumberland, West Va.; engaged in consulting industrial engineering practice for several years; organized and was the first President of Alaskan Steel Co.; and was Vice-President and General Manager of Chicago Forging & Mfg. Co. for nearly 10 years before becoming associated in 1934 with R.C.A. Mfg. Co., Inc.

• **William F. Kinsella,** vice-president and treasurer of the Worden-Allen Co., Milwaukee, steel fabricators, died recently. He joined Worden-Allen in 1903 as a draftsman and engineer, later joined the construction and sales department, and in 1909 was made vice-president. In 1936 he was made treasurer also.

• **Kenneth W. Bair,** chief inspector at Briggs & Stratton Co., Milwaukee, for the past 13 years, died, aged 46 years.

# NON-FERROUS METALS

**. . . MARKET ACTIVITIES AND PRICE TRENDS**

## *Lead Surplus Grows; Wider Use Predicted*

• • • **With about 30 per cent** of current lead production and imports going into government stockpiles, it is expected that metal users will soon be encouraged to use lead, particularly as a substitute. The apparently unexpected size of the surplus is due to the effectiveness of the lead conservation order, the restrictions on manufacture of products such as automobile batteries and private building, in which large amounts of lead have been used in the past, and the fact that shipments have been successfully coming through from Mexico, Australia, Canada and Peru.

Though the War Department retains lead on its list of critical metals, experiments for its use as a substitute are said to be already under way, and informed sources expect it to be recommended soon for increased use in plumbing pipe, solder, water service pipes, building flashings, fuses and bearings. In addition, they expect it to be used in smaller quantities where lead has not before been commonly used, as to replace copper in blasting caps, for nickel-iron in Edison storage batteries, for asbestos pipe couplings formerly made of bronze, for label plates, and for automatic pencil tips. Lead pipe, sheets and fittings are reported about to be placed on the unrestricted list.

About April 1, results of lead conservation began to be apparent, with consumption soon dropping 25 per cent. September consumption is expected to be about 60 per cent of the month's production and imports.

**The price** at which silver may be imported into the United States from Mexico has been raised from 35⅜c. an ounce to 45c. f. o. b. New York or San Francisco. This action was announced by the Department of State and the OPA, and will become effective Aug. 31. Mexico is the largest exporter of silver to the United States, and it is expected that a similar price will shortly become effective for other silver imports.

**The American Foundrymen's** Association, recognizing the new importance of light metals, has divided its Non-Ferrous division to create a new Light Alloys division. The present Non-Ferrous division will become the Brass and Bronze division. The first step in the organization of the new division will be the appointment of an advisory committee to direct its activities. A number of men prominent in the industry have already volunteered for service, and the Association suggests that others interested get in touch with R. E. Kennedy, Secretary of the AFA, at 222 West Adams Street, Chicago.

**Tin exports** from Bolivia for the first five months of 1942, amounting to 16,017 tons, totaled 780 tons less than in the same period last year. It had been estimated that Bolivia would export 45,000 tons this year, but shipments through May were at the rate of only about 38,500 tons per year. It is possible that the price increase granted a few months ago by agreement with the Metals Reserve Co. may step up production.

**Molybdenum Corp.** of America will operate the Urad mine, high in the Rockies, which has been purchased by the government from Vanadium Corp. of America for $110,000. The mine, long inactive, produced molybdenum during the first World War.

### Non-Ferrous Prices

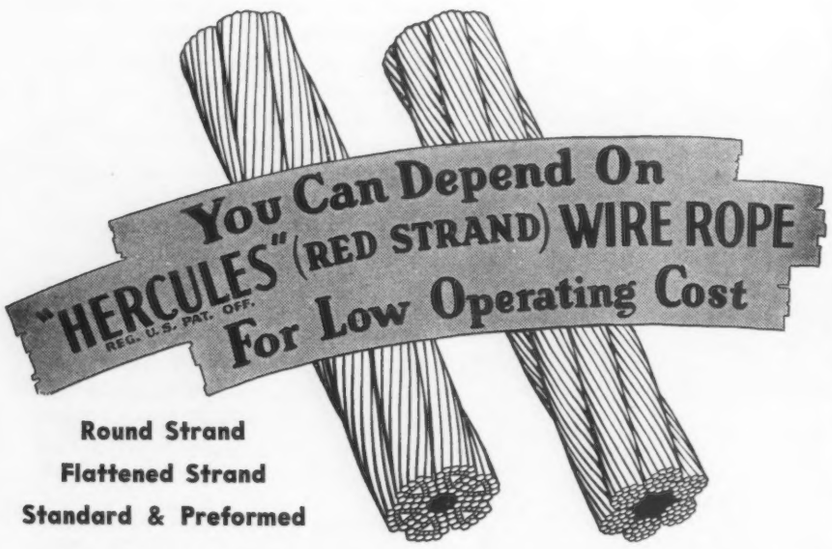
*(Cents per lb. for early delivery)*

| | |
|---|---|
| Copper Electrolytic[1] | 12.00 |
| Copper, Lake | 12.00 |
| Tin, Straits, New York | 52.00 |
| Zinc, East St. Louis[2] | 8.25 |
| Lead St. Louis[3] | 6.35 |

[1] Mine producers' quotations only, delivered Conn. Valley. Deduct ¼c. for approximate New York delivery price. [2] Add 0.39c. for New York delivery. [3] Add 0.15c. for New York delivery.

### Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered: virgin, 99 per cent plus, 15c.-16c. a lb.; No. 12 remelt No. 2, standard, 14.50c. a lb. NICKEL electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt; Asiatic, nominal, New York; American, 14.50c. a lb., f.o.b. smelter. QUICKSILVER, $197 to $199 per 76 lb. flask, f.o.b. shipping point. BRASS INGOTS, commercial 85-5-5-5, 13.25c. a lb.


**Round Strand**
**Flattened Strand**
**Standard & Preformed**

WHY not let "HERCULES" (Red-Strand) Wire Rope help you meet present day production requirements and still maintain a reasonable margin of profit? You will quickly discover that "HERCULES" is a dependable ally—not only in today's fight against increasing operating costs—but also in your endeavor to speed up production.

*Made Only By* **A. LESCHEN & SONS ROPE CO.** *Established 1857*
**5909 Kennerly Avenue, St. Louis, Mo.**
New York • Chicago • Denver • San Francisco • Seattle • Portland

# MACHINE TOOLS

**. . . SALES, INQUIRIES AND MARKET NEWS**

## Material Shortages Found Less Serious Than Expected

*Cleveland*

• • • **Despite many** conflicting rumors, it appears that the raw materials situation as it affects the machine tool industry may not be as serious as expected. For example, it is pointed out that the over-all backlog of the industry still extends over many months, despite numerous cancellations, and that many of the machines on order are for vital use in connection with domestic or over-seas military operations. It is pointed out that tooling setups will have to be established at the various points all over the globe where the allied nations are operating, so that breakdowns in military equipment can be repaired, and as a matter of fact, many such tool shops have already been set up abroad. For this reason, reliable observers believe that the machine tool industry will be given better treatment so far as raw materials are concerned during the near future. However, until that develops, the machine tool industry will continue to be hampered by spot shortages and other difficulties attendant to securing the large quantities of materials that they need.

Each passing week witnesses a new peak in resourcefulness being attained by some machine tool builder or other in the attempt to get along with whatever is available. In recent issues of THE IRON AGE it has been pointed out that some companies have already resorted to adapting various types and sizes of steel to fit needs for which such material ordinarily would not be used. This week it is reported that one machine tool company has begun making its own bearings. In view of the continued difficulty expected to be witnessed by the industry in securing bearings, it is not unlikely that other companies will resort to this practice. In the meantime, representatives of machine tool companies continue their attempts to convince tool purchasers that more simplified units could be used to do the necessary job, in order to conserve materials and time. It is reported that the entire industry may take some action in attempting to get purchasers of turret lathes and similar units to eliminate where possible such items as the gear box, the lead screw, the thread cutting gear box, the compound slab, and tail stock, among other features of machine tools.

Even though some relief is expected for the machine tool industry on materials, it is believed that monthly production beginning September may fall below the August total.

•

## Machine Tool Demand Still Heavy, Survey Shows

*Chicago*

• • • **Reports that the** machine tool industry is over the hump are termed as premature and misleading by machine tool plant executives. THE IRON AGE editors, in recent extensive tour of mid western machine tool plants found that backlogs of most builders still extend well into the second and third quarters of next year and the demand is as great as it has been in any month since the April rush. In a few lines, covering mostly small items, the demand has been somewhat reduced in the past month but no case was found where orders had fallen below shipments.

A slackening by the end of the year is generally expected but each time there is a change in production strategy there is usually an accompanying increase in demand for certain types of equipment which immediately reflects on machine tool orders.

Many machine tool plants still have expansion programs underway which will not be completed for some months yet. There is no indication thus far that these projects will be abandoned. To the contrary, they are being pushed to completion at top speed.

Labor and materials are still the No. 1 problems of the industry.

HEAT-TREATED STEEL SHOT

**We manufacture shot and grit for endurance**

A shot or grit that will blast fast with a clean finish.

This is the only reason why so many operators are daily changing to our shot and grit, from Maine to California.

The unprecedented demand for our—

**Heat-Treated Steel Shot and Heat-Treated Steel Grit**

has enabled us to expand our production and maintain a quality that is more than satisfactory to our hundreds of customers all over the country.

•

**HARRISON ABRASIVE CORPORATION**

**Manchester, New Hampshire**

HEAT-TREATED STEEL GRIT

# SCRAP

**. . . MARKET ACTIVITIES AND QUOTATION TRENDS**

## Mills' Plight Recognized As Scrap Shortage Grows

• • • **As the realization** dawns that the steel industry will soon come face to face with a scrap shortage which is expected to cut into urgently needed war steel, frantic efforts are being made to bolster up the various plans put forth in recent months for scrap collections.

Nationwide scrap drives have not progressed as much as early estimates indicated and one look at the July steel output shows that had enough scrap been available the country would have had half a million tons more steel than was produced when the industry operated at 94.5 per cent of rated capacity. Steel experts say 102.5 per cent could have been reached with sufficient supplies. More significant than any other factor and portending dark days ahead is the fact that scrap shortages held down the ingot rate at a time when scrap collections should be at their highest.

The scrap industry has noted that scrap brokers, dealers and those familiar with the scrap situation have not always been the ones to be consulted in drives and much has already been said about the by-passing of the "junkie." Furthermore this past week has seen more scrap workmen drawn off, either to war jobs paying more money, or to the Army. If the rate of incoming scrap does not pick up rapidly in the next month or two, practically all large steel companies will enter the fall months on a hand-to-mouth basis. While efforts are being made to speed to completion various blast furnace stacks it is significant that many units have had to be taken out of production for relining.

Latest efforts to get scrap that is not ordinarily available in regular house-to-house drives, signify that officialdom is actually worried about the situation and it is hoped by steel operators that proposals to bring back scrap from Great Britain, where it is said mills are comfortably fixed, for the time being will be successful. It is said that action is expected soon that will result in scrap being returned to this country—a measure that would make up, to some extent, for the loss of "home" scrap when ingots and semifinished steel has been sent out on Lend-Lease orders.

What scrap authorities and steel men pray for is concrete and rapid action to break the jam in the scrap bottleneck but it is admitted that because of the price ceilings, organizations like the Waste Materials, Inc., must do a much larger job than is presently expected if scrap is to be uncovered in order to more economically exploit the full steel capacity of the country.

•

## Scrap Advisory Group Named

• • • **Eleven iron and steel** scrap dealers and six steel mill men have accepted invitations from Price Administrator Leon Henderson to serve on an advisory committee being created to offer suggestions on any problems which may arise with respect to iron and steel scrap prices, the Office of Price Administration announced today.

The committee—to be known as the Industry Advisory Committee for Revised Price Schedule No. 4 (on iron and steel scrap)—will serve as a liaison body between dealers, mills and the OPA.

In keeping with the terms of the Price Control Act of 1942, it will be purely advisory in nature.

Dealer's representatives on the committee are:

Sam Bassow, Bassow Brothers, Inc., New York City.
Joel Claster, Luria Brothers & Co., Inc., Philadelphia, Pa.
Joe Cohen, General Scrap Iron, Inc., Providence, R. I.

Quick-Fitting TRIPLEX
Threaded Fasteners Help
Your Plant Help To W
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WAR
Speed your assemblies with accurately formed Triplex Cap Screws, Bolts and Nuts that fit and tighten cleanly, quickly, avoiding delays caused by misfits. Write today for new information on deliveries — some items ready for immediate shipment. The Triplex Screw Co., Box 1768, Newburgh Station, Cleveland, Ohio.
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CAP AND SET SCREWS • BOLTS • NUTS AND RIVETS
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Everett Michaels, Hyman-Michaels Co., Chicago.
Sam Nathanson, M. Cohen & Son Co., Cleveland, Ohio.
Joseph Paper, Paper, Calmenson & Co., St. Paul, Minn.
Hans Popper, Commercial Metals Co., Dallas, Texas.
Marshall Shapiro, California Scrap Iron Corp., Oakland, Cal.
Edward T. Solomon, Max Solomon Co., Pittsburgh, Pa.
J. D. Wohl, Jaffe Wohl Co., Birmingham, Ala.
William J. Wolf, Wolf and Co., Hamilton, Ohio.
Consumers' representatives are:
W. J. Betzler, Republic Steel Corp., Cleveland, Ohio.
Paul Farrell, Great Lakes Steel Corp., Detroit, Mich.
L. D. Greene, Bethlehem Steel Co., Bethlehem, Pa.
W. W. MacMillan, National Malleable and Steel Castings Co., Cleveland, Ohio.
Lewis L. Middleton, Sheffield Steel Corp., Kansas City, Mo.
Albert Weihl, Pilack Steel Co., Cincinnati, Ohio.

The initial meeting of the committee will be held in the near future, at which time the 17 representatives will elect one of their number as chairman of the group.

Thereafter, the group will meet at the call of the chairman whenever pricing problems arise. The Office of Price Administration, when requested, will send representatives to meetings of the committee to discuss suggestions or questions the members may have regarding Revised Price Schedule No. 4, its form, or classifications, differentiations, or any future orders affecting iron and steel scrap which may be issued.

•

*ST. LOUIS*—Reflecting mainly results of the government drive and ideal weather, receipts of scrap iron and steel have picked up moderately. While new acquisitions by mills are not large enough to add to inventories, at least impingement on reserves, noted in recent weeks, has stopped. The drive is progressing well, and should show substantial results shortly.

•

*CHICAGO*—The periodic recrudesence of rumors of upward revisions in scrap prices was noted again last week as the general scrap picture continued to be one of shipments just barely balancing consumption. These rumors in some cases reflect the desperate but unsuccessful efforts of dealers to get out more scrap to permit building of winter stocks. These dealers too often run into small lots which cannot be moved because of problems of hauling or preparing and honestly believe that a higher level would increase the flow. On the other hand many mill buyers are emphatically of the opinion that a price increase might do more harm than good. All, however, are agreed that new and more direct steps must be taken if serious shutdowns this winter are to be avoided. No open hearths are reported down this week due to lack of scrap, although practically all district mills are operating on a hand-to-mouth basis.

•

*PITTSBURGH* — The scrap shortage here apparently is being felt by foundries and electric furnaces, as well as the open hearths. Steel foundries, which were comfortably situated some time ago, are now seeking tonnage to stave off shutdowns. The local scrap collection setup here is somewhat better. No mills have accumulated important amounts of scrap against the coming winter, however.

•

*PHILADELPHIA*—The scrap situation here shows little change from last week with all grades being fairly tight and a pronounced lack of incoming scrap being evident. Scrap operators state that if a salvage campaign is in effect they have been unable to notice its results. Consumers checked throughout the area report a satisfactory scrap situation at the moment but indicate that they are either cutting into inventory or are operating on a hand-to-mouth basis.

•

*BUFFALO* — While the movement through district yards generally is being maintained at the recent high rate, a few interests assert that secondary ferrous metal is not so readily obtainable. The latter condition is attributed to the steady drive for scrap which has been underway for the last several months. District mills, on the whole, report little progress in accumulation of stock piles for winter operations.

•

*CINCINNATI*—While the general situation in the scrap market is unchanged, so far as the flow of material to consumers is concerned, one interest in the area indicates that its inventory has been gradually coming down. Organization of Materials, Inc., is being hailed as a fine attempt to cure the scrap shortage.

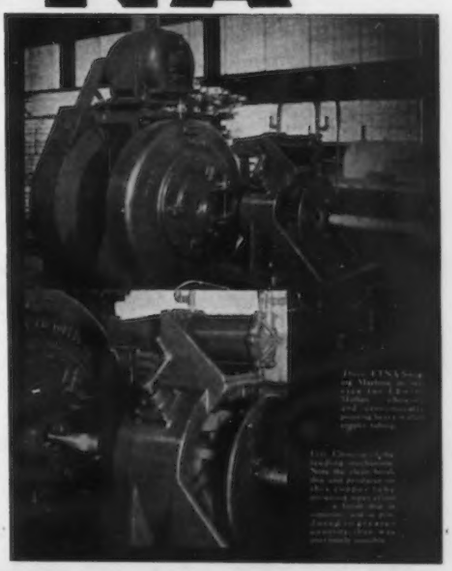
•

*TORONTO* — To provide substantially larger quantities of scrap required in Canada's steel making operations, F. B. Kilbourn, Steel Controller, has issued a new order which prohibits any person, without a permit, retaining in his possession after Sept. 15, any scrap metal weighing 500 pounds or more. Scrap dealers and consumers are not affected. For the purpose of the order scrap metal includes machinery, structural steel or any other article or commodiy containing iron or steel, which is not serving an immediate vital purpose. While the definition is broad enough to take in passenger cars and trucks not now in essential use, it is not the intention to order the disposal of such vehicles. "We will, however, insist on the application of the order to vehicles in automobile graveyards," Mr. Kilbourn stated. The Steel Controller also stated that fences and steel in partly completed buildings, and machinery now in actual operation in non-war plants, are covered by the order, but will not at present be affected. "The object of the order," Mr. Kilbourn stated, "is to compel the disposal of old or obsolete machinery, or scrap metal, which has been held for a better price or because of some imaginary future need.


LEWIN-MATHES *Got the right answer at*

# ETNA

**They had a job of pointing heavy-walled copper tubing, and wanted to speed up the operation. Just how to do it didn't appear on the horizon, and so Lewin-Mathes did the safe and logical thing—they put their swaging job up to Etna.**



The answer to that problem is illustrated on this page. It's a modern Etna Swaging Machine that points *more* copper tubes per hour in less time at less cost. If you have a problem involving tapering or reducing tubing and solid rounds—ask Etna about it.

Etna has the swaging machines from 3/8" to 4" and the experience to help you get the most out of this type of machine.

IF IT'S A QUESTION OF TAPERING, SIZING OR REDUCING OF ROUND SOLIDS OR TUBING... "Ask ETNA About Swaging"

ETNA MACHINE COMPANY
TOLEDO OHIO

## IRON AND STEEL (OTHER THAN RAILROAD) SCRAP

(All Prices Are Per Gross Ton)

| | BASIC OPEN HEARTH GRADES (No. 1 Heavy Melting; No. 1 Hydr. Compressed Black Sheets; No. 2 Heavy Melting; Dealers' No. 1 Bundles; Dealers' No. 2 Bundles; No. 1 Busheling) | BLAST FURNACE GRADES (Mixed Borings and Turnings; Shovelling Turnings; No. 2 Busheling; Cast Iron Borings) | ELECTRIC FURNACE, ACID OPEN HEARTH AND FOUNDRY GRADES | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Low Phos. | | Heavy Structural and Plate | | | Cut Auto. Steel Scrap | | | | |
| | | | Billet, Bloom, Forge Crops | Bar Crops, Punchings Plate Scrap and Cast Steel | 3 ft. and Under | 2 ft. and Under | 1 ft. and Under | 3 ft. and Under | 2 ft. and Under | 1 ft. and Under and Auto, Springs, and Crankshafts | Alloy free Low Phos. and Sulphur Turnings | Heavy Axle and Forge Turn. First Cut | Electric Furnace Bundles |
| Pittsburgh, Brackenridge, Butler, Monessen, Midland, Johnstown, Sharon, Canton, Steubenville, Warren, Youngstown, Weirton | $20.00 | $16.00 | $16.00 | $25.00 | $22.50 | $21.00 | $21.50 | $22.00 | $20.00 | $20.50 | $21.00 | $18.00 | $19.50 | $21.00 |
| Cleveland, Middletown, Cincinnati, Portsmouth | 19.50 | 15.50 | 15.50 | 24.50 | 22.00 | 20.50 | 21.00 | 21.50 | 19.50 | 20.00 | 20.50 | 17.50 | 19.00 | 20.50 |
| Chicago, Claymont, Coatesville, Conshohocken, Harrisburg, Phoerixville, Sparrows Pt. | 18.75 | 14.75 | 14.75 | 23.75 | 21.25 | 19.75 | 20.25 | 20.75 | 18.75 | 19.25 | 19.75 | 16.75 | 18.25 | 19.75 |
| Ashland, Ky. | 19.50 | 15.50 | 15.50 | 24.50 | 22.00 | 20.50 | 21.00 | 21.50 | 19.50 | 20.00 | 20.50 | 17.50 | 19.00 | 20.50 |
| Buffalo, N. Y. | 19.25 | 15.25 | 15.25 | 24.25 | 21.75 | 20.25 | 20.75 | 21.25 | 19.25 | 19.75 | 20.25 | 17.25 | 18.75 | 20.25 |
| Bethlehem, Pa.; Kokomo, Ind. | 18.25 | 14.25 | 14.25 | 23.25 | 20.75 | 19.25 | 19.75 | 20.25 | 18.25 | 18.75 | 19.25 | 16.25 | 17.75 | 19.25 |
| Duluth, Minn. | 18.00 | 14.00 | 14.00 | 23.00 | 20.50 | 19.00 | 19.50 | 20.00 | 18.00 | 18.50 | 19.00 | 16.00 | 17.50 | 19.00 |
| Detroit, Mich. | 17.85 | 13.85 | 13.85 | 22.85 | 20.35 | 18.85 | 19.85 | 19.85 | 17.85 | 18.35 | 18.85 | 15.85 | 17.35 | 18.85 |
| Toledo, Ohio | ..... | 13.85 | 13.85 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| St. Louis, Mo. | 17.50 | 13.50 | 13.50 | 22.50 | 20.00 | 18.50 | 19.00 | 19.50 | 17.50 | 18.00 | 18.50 | 15.50 | 17.00 | 18.50 |
| Atlanta, Ga.; Alabama City, Ala.; Birmingham, Los Angeles; Pittsburg, Cal.; San Francisco | 17.00 | 13.00 | 13.00 | 22.00 | 19.50 | 18.00 | 18.50 | 19.00 | 17.00 | 17.50 | 18.00 | 15.00 | 16.50 | 18.00 |
| Minnequa, Colo. | 16.50 | 12.50 | 12.50 | 21.50 | 19.00 | 17.50 | 18.00 | 18.50 | 16.50 | 17.00 | 17.50 | 14.50 | 16.00 | 17.50 |
| Seattle, Wash. | 14.50 | 10.50 | 10.50 | 19.50 | 17.00 | 15.50 | 16.00 | 16.50 | 14.50 | 15.00 | 15.50 | 12.50 | 14.00 | 15.50 |

**BUNDLES:** Tin can bundles are $4 below dealers' No. 2 bundles; No. 3 bundles are $2 less than No. 1 heavy melting.

**SWITCHING CHARGES:** Deductions for shipping points within basing points (cents per gross ton) are: Pittsburgh, Brackenridge, 55c.; Midland, Johnstown, Sharon, Youngstown, Warren, Weirton, Cleveland, Toledo, Los Angeles, San Francisco, 42c.; Butler, Monessen, Canton, Steubenville, Cincinnati*, Portsmouth, Ashland, Coatesville, Harrisburg, Phoenixville, Bethlehem, Kokomo, Duluth, St. Louis, 28c.; Buffalo, Claymont, 36c.; Conshohocken, 11c.; Atlanta, Birmingham, 32c.; Pittsburg, Cal., 42c.; Middletown, 14c.; Sparrow's Point, 11c.; Chicago, 84c.; Detroit, 53c.; Alabama City, 26c.; Minnequa, 22c.; Seattle, 38c.. *At Cincinnati, for basic open hearth grades, cut auto scrap and auto springs and crankshafts, deduct 80c. per ton.

**PITTSBURGH** basing point includes switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport. Cincinnati basing point includes Newport, Ky., switching district. St. Louis includes switching districts of Granite City, East St. Louis, Madison, Ill. San Francisco includes switching districts of S. San Francisco, Niles and Oakland, Cal.

**MAXIMUM** prices of inferior grades shall continue to bear same differential below corresponding grades as existed during the period Sept. 1, 1940, to Jan. 31, 1941. Superior grades cannot be sold at a premium without approval of OPA. Special preparation charges in excess of the above prices are banned. Whenever any electric furnace or foundry grades are purchased for open hearth or blast furnace use, prices may not exceed the prices above for the corresponding open hearth grades.

**MAXIMUM SHIPPING POINT PRICE**—Where shipment is by rail or vessel, or by combination of rail and vessel, the scrap is at its shipping point when placed f.o.b. railroad car or f.a.s. vessel. In such cases, the maximum shipping point prices shall be: (a) For shipping points located within a basing point, the price listed in the table above for the scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point and (b) for shipping points located outside the basing point, the price in table above at the most favorable basing point minus the lowest transportation charge by rail or water or combination thereof. Dock charge is 75c. a ton*, but 50c. if moved by deck scow or railroad lighter. Shipping by motor vehicle: The scrap is at its shipping point when loaded. For shipping points located within basing points take price listed in table minus applicable switching charge. If located outside a basing point, the price at the most favorable basing point minus lowest established charge for transporting by common carrier. If no established transportation rate exists, the customary costs are deducted. Published dock charges prevail. If unpublished include 75c.* For exceptions see official order.

**AT NEW YORK** city or Brooklyn, the maximum shipping point price is $15.33 for No. 1 heavy melting, f.o.b. cars, f.a.s. vessel or loaded on truck. Other grades carry differentials similar to those in table. New Jersey prices must be computed on basis of all-rail. At Boston the maximum is $15.05 for No. 1 f.o.b. cars, f.a.s. vessel or loaded on trucks. Shipments from a New England shipping point to a consumer outside New England carry maximum transportation charge of $6.65 per ton.

**UNPREPARED SCRAP:** For unprepared scrap, maximum prices shall be $2.50 (and in the case of the material from which No. 1, No. 2, and No. 3 bundles are made $4) less the maximum prices for the corresponding grade or grades of prepared scrap. In no case, however, shall electric furnace and foundry grades be used as the "corresponding grade or grades of prepared scrap." Converter may charge $2.50 per ton on consumer-owned unprepared remote scrap (see order).

Maximum price of all scrap in a vehicle is that of the lowest price grade in the shipment. This limitation does not apply to vessel shipments if grades are segregated.

Where scrap is to undergo preparation prior to its arrival at the point of delivery, such scrap is not at its shipping point, as that phrase is defined above, until after preparation has been completed.

**CHEMICAL BORINGS:** No. 1 (new, clean, containing not more than 1 per cent oil), $1 less than No. 1 heavy melting; No. 2 (new, clean, containing not more than 1.5 per cent oil), $2 less than No. 1 heavy melting. If loaded in box cars add 75c.

**UNPREPARED CAST IRON SCRAP**—Except for heavy breakable cast, unprepared scrap is given a price ceiling of $2.50 per ton less than the maximum prices for the corresponding grade of prepared cast iron scrap. Where scrap is to undergo preparation prior to arrival at the point of delivery, such scrap is not considered at shipping point until preparation is completed.

Consumers of cast scrap may pay the shipping point price plus established charge for transporting the scrap to their plants. In the case of deliveries by truck, the cast scrap buyer must obtain from the seller a certification, made out to OPA.

*At Memphis 50c.; Great Lakes ports $1; New England $1.25.

### RAILROAD SCRAP

| | No. 1 RR Heavy Melting | Scrap Rails | Rails for Rerolling | Scrap Rails: 3 ft. and Under | Scrap Rails: 2 ft. and Under | Scrap Rails: 18 in. and Under |
|---|---|---|---|---|---|---|
| Clevelaud, Cincinnati, Ashland, Portsmouth, Middletown | $20.50 | $21.50 | $23.00 | $23.50 | $23.75 | $24.00 |
| Canton, Pittsburgh, Sharon, Steubenville, Wheeling, Youngstown | 21.00 | 22.00 | 23.50 | 24.00 | 24.25 | 24.50 |
| Chicago, Philadelphia, Sparrows Pt., Wilmington, Birmingham, Los Angeles, San Francisco | 19.75 | 20.75 | 22.25 | 22.75 | 23.00 | 23.25 |
| Buffalo | 18.00 | 19.00 | 20.50 | 21.00 | 21.25 | 21.50 |
| Detroit | 20.25 | 21.25 | 22.75 | 23.25 | 23.50 | 23.75 |
| Duluth | 18.85 | 19.85 | 21.35 | 21.85 | 22.10 | 22.35 |
| Kansas City, Mo. | 19.00 | 20.00 | 21.50 | 22.00 | 22.25 | 22.50 |
| Kokomo, Ind. | 17.00 | 18.00 | 19.50 | 20.00 | 20.25 | 20.50 |
| Seattle | 19.25 | 20.25 | 21.75 | 22.25 | 22.50 | 22.75 |
| St. Louis | 15.50 | 16.50 | 18.00 | 18.50 | 18.75 | 19.00 |
| | 18.50 | 19.50 | 21.00 | 21.50 | 21.75 | 22.00 |

### CAST IRON SCRAP

| | Group A | Group B | Group C |
|---|---|---|---|
| No. 1 cupola cast | $18.00 | $19.00 | $20.00 |
| No. 1 machinery cast, drop broken, 150 lbs. and under | 18.00 | 19.00 | 20.00 |
| Clean auto cast | 18.00 | 19.00 | 20.00 |
| Unstripped motor blocks | 17.50 | 18.50 | 19.50 |
| Stove Plate | 17.00 | 18.00 | 19.00 |
| Heavy Breakable Cast | 15.50 | 16.50 | 17.50 |
| Charging box size cast | 17.00 | 18.00 | 19.00 |
| Misc. Malleable | 20.00 | 21.00 | 22.00 |

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

Group C: States not named in A and B; switch district of Kansas City, Kan., Mo.

# . . . Composite Prices

Advances Over Past Week in **Heavy Type**; Declines in *Italics*. (Prices Are F.O.B. Major Basing Points)

| Flat Rolled Steel: (Cents Per Lb.) | Aug. 25, 1942 | Aug. 18, 1942 | July 28, 1942 | Aug. 26, 1941 |
|---|---|---|---|---|
| Hot rolled sheets | 2.10 | 2.10 | 2.10 | 2.10 |
| Cold rolled sheets | 3.05 | 3.05 | 3.05 | 3.05 |
| Galvanized sheets (24 ga.) | 3.50 | 3.50 | 3.50 | 3.50 |
| Hot rolled strip | 2.10 | 2.10 | 2.10 | 2.10 |
| Cold rolled strip | 2.80 | 2.80 | 2.80 | 2.80 |
| Plates | 2.10 | 2.10 | 2.10 | 2.10 |
| Stain's c.r. strip (No. 302) | 28.00 | 28.00 | 28.00 | 28.00 |
| **Tin and Terne Plate:** (Dollars Per Base Box) | | | | |
| Tin plate | $5.00 | $5.00 | $5.00 | $5.00 |
| Manufacturing ternes | 4.30 | 4.30 | 4.30 | 4.30 |
| **Bars and Shapes:** (Cents Per Lb.) | | | | |
| Merchant bars | 2.15 | 2.15 | 2.15 | 2.15 |
| Cold finished bars | 2.65 | 2.65 | 2.65 | 2.65 |
| Alloy bars | 2.70 | 2.70 | 2.70 | 2.70 |
| Structural shapes | 2.10 | 2.10 | 2.10 | 2.10 |
| Stainless bars (No. 302) | 24.00 | 24.00 | 24.00 | 24.00 |
| **Wire and Wire Products:** (Cents Per Lb.) | | | | |
| Plain wire | 2.60 | 2.60 | 2.60 | 2.60 |
| Wire nails | 2.55 | 2.55 | 2.55 | 2.55 |
| **Rails:** (Dollars Per Gross Tons) | | | | |
| Heavy rails | $40.00 | $40.00 | $40.00 | $40.00 |
| Light rails | 40.00 | 40.00 | 40.00 | 40.00 |
| **Semi-Finished Steel:** (Dollars Per Gross Ton) | | | | |
| Rerolling billets | $34.00 | $34.00 | $34.00 | $34.00 |
| Sheet bars | 34.00 | 34.00 | 34.00 | 34.00 |
| Slabs | 34.00 | 34.00 | 34.00 | 34.00 |
| Forging billets | 40.00 | 40.00 | 40.00 | 40.00 |
| Alloy blooms, billets, slabs | 54.00 | 54.00 | 54.00 | 54.00 |
| **Wire Rods and Skelp:** (Cents Per Lb.) | | | | |
| Wire rods | 2.00 | 2.00 | 2.00 | 2.00 |
| Skelp (grvd) | 1.90 | 1.90 | 1.90 | 1.90 |

| Pig Iron: (Per Gross Ton) | Aug. 25, 1942 | Aug. 18, 1942 | July 28, 1942 | Aug. 26, 1941 |
|---|---|---|---|---|
| No. 2 fdy., Philadelphia | $25.89 | $25.89 | $25.89 | $25.84 |
| No 2, Valley furnace | 24.00 | 24.00 | 24.00 | 24.00 |
| No. 2, Southern Cin'ti | 24.68 | 24.68 | 24.68 | 24.06 |
| No. 2, Birmingham | 20.38 | 20.38 | 20.38 | 20.38 |
| No. 2, foundry, Chicago† | 24.00 | 24.00 | 24.00 | 24.00 |
| Basic, del'd eastern Pa. | 25.39 | 25.39 | 25.39 | 25.34 |
| Basic, Valley furnace | 23.50 | 23.50 | 23.50 | 23.50 |
| Malleable, Chicago† | 24.00 | 24.00 | 24.00 | 24.00 |
| Malleable, Valley | 24.00 | 24.00 | 24.00 | 24.00 |
| L. S. charcoal, Chicago | 31.34 | 31.34 | 31.34 | 31.34 |
| Ferromanganese‡ | 135.00 | 135.00 | 135.00 | 120.00 |

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.
‡For carlots at seaboard.

| Scrap: (Per Gross Ton) | | | | |
|---|---|---|---|---|
| Heavy melt'g steel, P'gh. | $20.00 | $20.00 | $20.00 | $20.00 |
| Heavy melt'g steel, Phila. | 18.75 | 18.75 | 18.75 | 18.75 |
| Heavy melt'g steel, Ch'go | 18.75 | 18.75 | 18.75 | 18.75 |
| No. 1 hy. comp. sheet, Det. | 17.85 | 17.85 | 17.85 | 17.85 |
| Low phos. plate, Youngs'n | 22.50 | 22.50 | 22.50 | 23.00 |
| No. 1 cast, Pittsburgh | 20.00 | 20.00 | 20.00 | 22.00 |
| No. 1 cast, Philadelphia | 20.00 | 20.00 | 20.00 | 24.00 |
| No. 1 cast, Ch'go | 20.00 | 20.00 | 20.00 | 20.00 |
| **Coke, Connellsville:** (Per Net Ton at Oven) | | | | |
| Furnace coke, prompt | $6.00 | $6.00 | $6.00 | $6.125 |
| Foundry coke, prompt | 6.875 | 6.875 | 6.875 | 6.875 |
| **Non-Ferrous Metals:** (Cents per Lb. to Large Buyers) | | | | |
| Copper, electro., Conn. | 12.00 | 12.00 | 12.00 | 12.00 |
| Copper, Lake, New York | 12.00 | 12.00 | 12.00 | 12.00 |
| Tin (Straits), New York | 52.00 | 52.00 | 52.00 | 52.00 |
| Zinc, East St. Louis | 8.25 | 8.25 | 8.25 | 7.25 |
| Lead, East St Louis | 6.35 | 6.35 | 6.35 | 5.70 |
| Antimony (Asiatic), N. Y. | 16.50 | 16.50 | 16.50 | 16.50 |

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 122 to 130 herein.

# . . . Comparison of Prices

| | FINISHED STEEL | PIG IRON | SCRAP STEEL |
|---|---|---|---|
| Aug. 25, 1942 | 2.30467c. a Lb. | $23.61 a Gross Ton | $19.17 a Gross Ton |
| One week ago | 2.30467c. a Lb. | $23.61 a Gross Ton | $19.17 a Gross Ton |
| One month ago | 2.30467c. a Lb. | $23.61 a Gross Ton | $19.17 a Gross Ton |
| One year ago | 2.30467c. a Lb. | $23.61 a Gross Ton | $19.17 a Gross Ton |

| | FINISHED STEEL HIGH | FINISHED STEEL LOW | PIG IRON HIGH | PIG IRON LOW | SCRAP STEEL HIGH | SCRAP STEEL LOW |
|---|---|---|---|---|---|---|
| 1942 | 2.30467c., | 2.30467c., | $23.61 | $23.61 | $19.17 | $19.17 |
| 1941 | 2.30467c., | 2.30467c., | $23.61, Mar. 20 | $23.45, Jan. 2 | $22.00, Jan. 7 | $19.17, Apr. 10 |
| 1940 | 2.30467c., Jan. 2 | 2.24107c., Apr. 16 | 23.45, Dec. 23 | 22.61, Jan. 2 | 21.83, Dec. 30 | 16.04, Apr. 9 |
| 1939 | 2.35367c., Jan. 3 | 2.26689c., May 16 | 22.61, Sept. 19 | 20.61, Sept. 12 | 22.50, Oct. 3 | 14.08, May 16 |
| 1938 | 2.58414c., Jan. 4 | 2.27207c., Oct. 18 | 23.25, June 21 | 19.61, July 6 | 15.00, Nov. 22 | 11.00, June 7 |
| 1937 | 2.58414c., Mar. 9 | 2.32263c., Jan. 4 | 23.25, Mar. 9 | 20.25, Feb. 16 | 21.92, Mar. 30 | 12.92, Nov. 10 |
| 1936 | 2.32263c., Dec. 28 | 2.05200c., Mar. 10 | 19.74, Nov. 24 | 18.73, Aug. 11 | 17.75, Dec. 21 | 12.67, June 9 |
| 1935 | 2.07642c., Oct. 1 | 2.06492c., Jan. 8 | 18.84, Nov. 5 | 17.83, May 14 | 13.42, Dec. 10 | 10.33, Apr. 29 |
| 1934 | 2.15367c., Apr. 24 | 1.95757c., Jan. 2 | 17.90, May 1 | 16.90, Jan. 27 | 13.00, Mar. 13 | 9.50, Sept. 25 |
| 1933 | 1.95578c., Oct. 3 | 1.75836c., May 2 | 16.90, Dec. 5 | 13.56, Jan. 3 | 12.25, Aug. 8 | 6.75, Jan. 3 |
| 1932 | 1.89196c., July 5 | 1.83901c., Mar. 1 | 14.81, Jan. 5 | 13.56, Dec. 6 | 8.50, Jan. 12 | 6.43, July 5 |
| 1931 | 1.99629c., Jan. 13 | 1.86586c., Dec. 29 | 15.90, Jan. 6 | 14.79, Dec. 15 | 11.33, Jan. 6 | 8.50, Dec. 29 |
| 1930 | 2.25488c., Jan. 7 | 1.97319c., Dec. 9 | 18.21, Jan. 7 | 15.90, Dec. 16 | 15.00, Feb. 18 | 11.25, Dec. 9 |
| 1929 | 2.31773c., May 28 | 2.26498c., Oct. 29 | 18.71, May 14 | 18.21, Dec. 17 | 17.58, Jan. 29 | 14.08, Dec. 3 |

Weighted index based on steel bars, beams, tank plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 per cent of the United States output. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

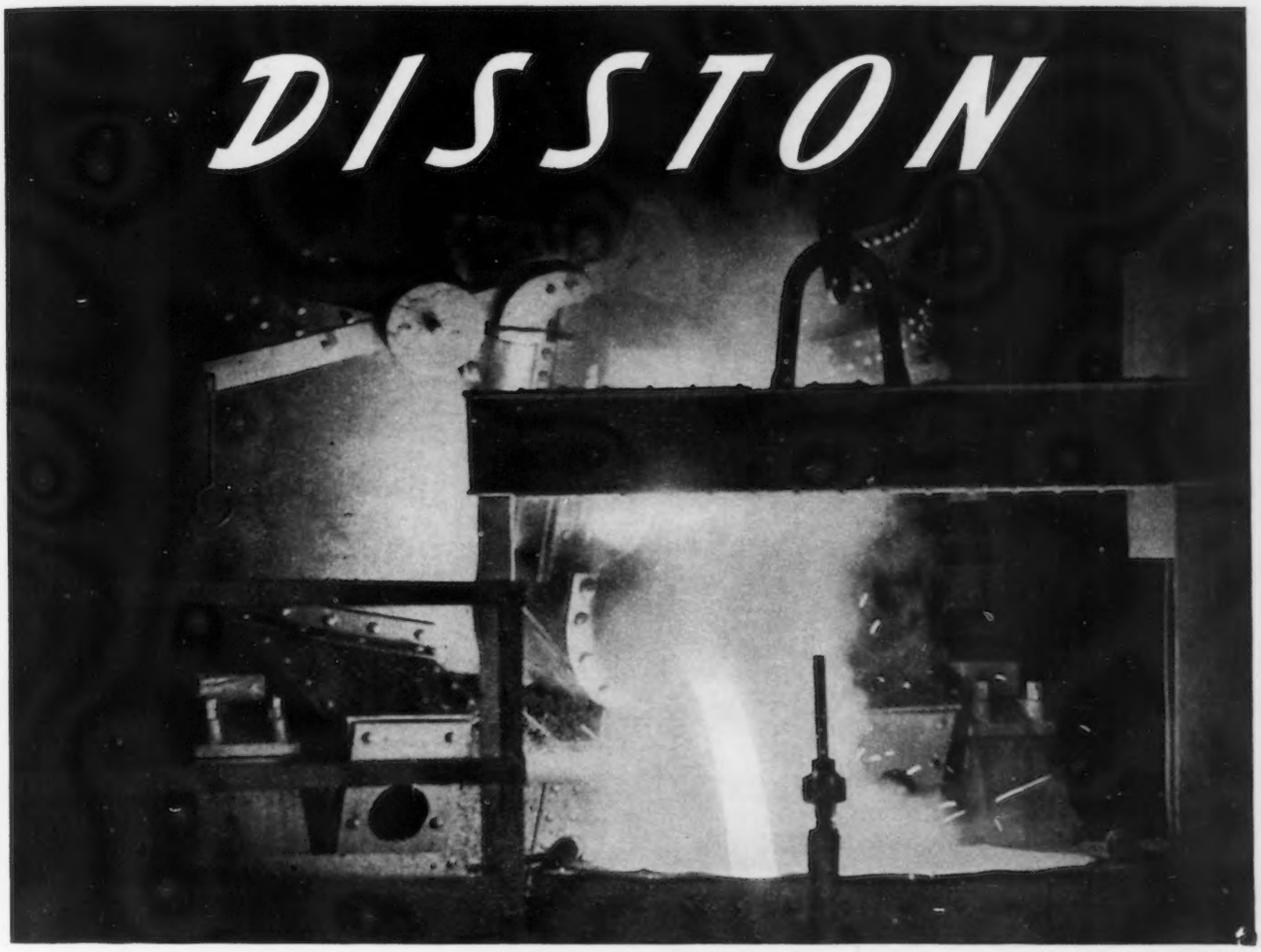
# Prices of Finished Iron and Steel . . .

Steel prices shown here are f.o.b. basing points, in cents per lb., unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases freight absorbed to meet competition.

| Basing Point → / Product ↓ | Pittsburgh | Chicago | Gary | Cleveland | Birmingham | Buffalo | Youngstown | Sparrows Point | Granite City | Middletown, Ohio | Gulf Ports, Cars | Pacific Ports, Cars [10] | DELIVERED TO Detroit | New York | Philadelphia |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **SHEETS** | | | | | | | | | | | | | | | |
| Hot rolled | 2.10¢ | 2.10¢ | 2.10¢ | 2.10¢ | 2.10¢ | 2.10¢ | 2.10¢ | 2.10¢ | 2.20¢ | 2.10¢ | | 2.65¢ | 2.22¢ | 2.35¢ | 2.28¢ |
| Cold rolled [1] | 3.05¢ | 3.05¢ | 3.05¢ | 3.05¢ | | 3.05¢ | 3.05¢ | | 3.15¢ | 3.05¢ | | 3.70¢ | 3.17¢ | 3.41¢ | 3.39¢ |
| Galvanized (24 ga.) | 3.50¢ | 3.50¢ | 3.50¢ | | 3.50¢ | 3.50¢ | 3.50¢ | 3.50¢ | 3.60¢ | 3.50¢ | | 4.05¢ | | 3.75¢ | 3.68¢ |
| Enameling (20 ga.) | 3.35¢ | 3.35¢ | 3.35¢ | 3.35¢ | | | 3.35¢ | | 3.45¢ | 3.35¢ | | 4.00¢ | 3.47¢ | 3.73¢ | 3.69¢ |
| Long ternes [2] | 3.80¢ | | 3.80¢ | | | | | | | | | 4.55¢ | | 4.18¢ | 4.14¢ |
| **STRIP** | | | | | | | | | | | | | | | |
| Hot rolled [3] | 2.10¢ | 2.10¢ | 2.10¢ | 2.10¢ | 2.10¢ | | 2.10¢ | | | 2.10¢ | | 2.75¢ | 2.22¢ | 2.48¢ | |
| Cold rolled [4] | 2.80¢ | 2.90¢ | | 2.80¢ | | | 2.80¢ | (Worcester =3.00¢) | | | | | 2.92¢ | 3.18¢ | |
| Cooperage stock | 2.20¢ | 2.20¢ | | | 2.20¢ | | 2.20¢ | | | | | | | 2.58¢ | |
| Commodity C-R | 2.95¢ | | | 2.95¢ | | | 2.95¢ | (Worcester =3.35¢) | | | | | 3.07¢ | 3.33¢ | |
| **TIN PLATE** | | | | | | | | | | | | | | | |
| Standard cokes, base box | $5.00 | $5.00 | $5.00 | | | | | | $5.10 | | | | | 5.38¢ | 5.34¢ |
| **BLACK PLATE** | | | | | | | | | | | | | | | |
| 29 gage [5] | 3.05¢ | 3.05¢ | 3.05¢ | | | | | | 3.15¢ | | | 4.05¢ [13] | | | 3.39¢ |
| **TERNES, M'FG.** | | | | | | | | | | | | | | | |
| Special coated, base box | $4.30 | $4.30 | $4.30 | | | | | | $4.40 | | | | | | |
| **BARS** | | | | | | | | | | | | | | | |
| Carbon steel | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | | (Duluth =2.25¢) | | | 2.52¢ | 2.80¢ | 2.27¢ | 2.51¢ | 2.49¢ |
| Rail steel [6] | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | | | | | 2.52¢ | 2.80¢ [14] | | | |
| Reinforcing (billet) [7] | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | | | 2.52¢ | 2.55¢ [14] | 2.27¢ | 2.40¢ | |
| Reinforcing (rail) [7] | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | | | | 2.52¢ | 2.55¢ | 2.27¢ | | 2.49¢ |
| Cold finished [8] | 2.65¢ | 2.65¢ | 2.65¢ | 2.65¢ | | 2.65¢ | | | (Detroit =2.70¢) | | | | | 3.01¢ | 2.99¢ |
| Alloy, hot rolled | 2.70¢ | 2.70¢ | | | | 2.70¢ | | (Bethlehem, Massilon, Canton =2.70¢ | | | | | 2.82¢ | | |
| Alloy, cold drawn | 3.35¢ | 3.35¢ | 3.35¢ | 3.35¢ | | 3.35¢ | | | | | | | 3.47¢ | | |
| **PLATES** | | | | | | | | (Coatesville and Claymont =2.10¢) | | | | | | | |
| Carbon steel | 2.10¢ | 2.10¢ | 2.10¢ | 2.10¢ | 2.10¢ | | 2.10¢ | 2.10¢ | 2.25¢ [11] | | 2.47¢ | 2.65¢ | 2.33¢ | 2.30¢ | 2.155¢ |
| Wrought iron | 3.80¢ | | | | | | | | | | | | | | |
| Floor plates | 3.35¢ | 3.35¢ | | | | | | | | | 3.72¢ | 4.00¢ | | 3.73¢ | 3.69¢ |
| Alloy | 3.50¢ | 3.50¢ | | | (Coatesville =3.50¢) | | | | | | 3.97¢ | 4.15¢ | | 3.71¢ | 3.60¢ |
| **SHAPES** | | | | | | | | | | | | | | | |
| Structural | 2.10¢ | 2.10¢ | 2.10¢ | | 2.10¢ | 2.10¢ | | (Bethlehem =2.10¢) | | | 2.47¢ | 2.75¢ | | 2.28¢ | 2.22¢ |
| **SPRING STEEL, C-R** | | | | | | | | | | | | | | | |
| 0.26 to 0.50 Carbon | 2.80¢ | | | 2.80¢ | | | (Worcester =3.00¢) | | | | | | | | |
| 0.51 to 0.75 Carbon | 4.30¢ | | | 4.30¢ | | | (Worcester =4.50¢) | | | | | | | | |
| 0.76 to 1.00 Carbon | 6.15¢ | | | 6.15¢ | | | (Worcester =6.35¢) | | | | | | | | |
| 1.01 to 1.25 Carbon | 8.35¢ | | | 8.35¢ | [4] | | (Worcester =8.55¢) | | | | | | | | |
| **WIRE** [9] | | | | | | | | | | | | | | | |
| Bright [15] | 2.60¢ | 2.60¢ | | 2.60¢ | 2.60¢ | | (Worcester =2.70¢) | | | | | 3.10¢ | | | 2.94¢ |
| Galvanized | add proper size extra and galvanized extra to bright wire base, above. | | | | | | | | | | | | | | |
| Spring (High Carbon) | 3.20¢ | 3.20¢ | | 3.20¢ | | | (Worcester =3.30¢) | | | | | 3.70¢ | | | 3.54¢ |
| **PILING** | | | | | | | | | | | | | | | |
| Steel sheet | 2.40¢ | 2.40¢ | | | | 2.40¢ | | | | | | 2.95¢ | | | 2.74¢ |
| **IRON BARS** [12] | | | | | | | | | | | | | | | |
| Wrought single refined | 4.40¢ | | | | | | | | | | | | | | |
| Wrought double refined | 5.40¢ | | | | | | | | | | | | | | |

[1] Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. [2] Unassorted 8-lb. coating. [3] Widths up to 12 in. [4] Carbon 0.25 per cent and less. [5] Applies to certain width and length limitations. [6] For merchant trade. [7] Prices for straight length material only, from a producer to a consumer. Functional discount of 25c. per 100 lb. to fabricators. [8] Also shafting. For quantities of 20,000 to 39,999 lb. [9] Carload lot to manufacturing trade. [10] These prices do not apply if the customary means of transportation (rail and water) are not used. [11] Ship plates only. [12] Common iron bars quoted at 2.15c. by Terre Haute, Ind. producer. [13] Boxed. [14] Portland and Seattle price, San Francisco price is 2.50c. [15] This bright wire base price to be used in figuring annealed and bright finish wires, commercial spring wire and galvanized wire.

# Remember this famous name in Fine Tool Steels

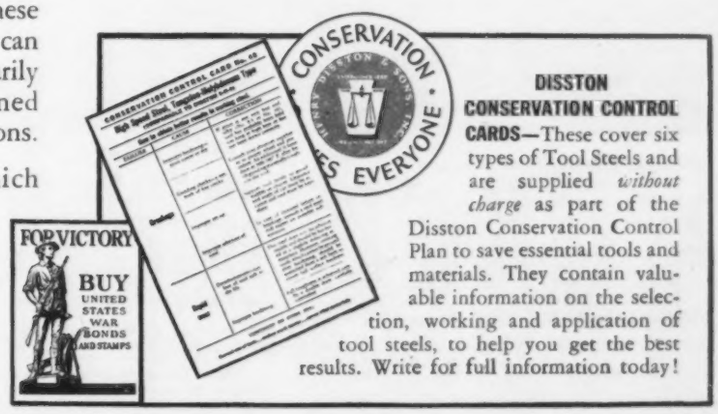



Disston is a name renowned in fine tool steel manufacture for 87 years. In 1855 Henry Disston began melting and rolling the first crucible saw steel ever made in America. In 1906 the first commercial heat of electric saw steel made in this country was cast in the Disston plant.

Years of pioneering and progress have established the standards to which fine Disston Tool Steels are made today. Experienced personnel—electric furnaces—selected materials—modern equipment—accurate chemical and metallurgical supervision...these produce Disston steels with characteristics which can be controlled within very close limits. Extraordinarily sound and clean tool steels with predetermined grain size can be made to precise specifications.

One of the outstanding tool steels which Disston has produced is CROLOY—a high chromium-molybdenum alloy steel with high resistance to both sliding and impinging wear, and with good air hardening qualities. Croloy is an excellent steel for dies, punches, swaging mandrels, gauges, shear blades, slitting cutters, planer knives and many high production tools.

*Selecting the proper tool steel:* Disston engineers and metallurgists will be glad to help you choose the tool steels which will do the best work on the job to be done—and give you the longest tool life ... If you do not have a copy of the illustrated 73-page book, "Disston Tool Steels," write today to Henry Disston & Sons, Inc., 819 Tacony, Philadelphia, Pa., U. S. A.




**DISSTON CONSERVATION CONTROL CARDS**—These cover six types of Tool Steels and are supplied *without charge* as part of the Disston Conservation Control Plan to save essential tools and materials. They contain valuable information on the selection, working and application of tool steels, to help you get the best results. Write for full information today!

## SEMI-FINISHED STEEL

### *Billets, Blooms and Slabs*

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are $2.25 higher; f.o.b. Duluth, billets only, $2 higher.

| | *Per Gross Ton* |
|---|---|
| Rerolling | $34.00 |
| Forging quality | 40.00 |

### *Shell Steel*

| | *Per Gross Ton* |
|---|---|
| 3 in. to 12 in. | $52.00 |
| 12 in. to 18 in. | 54.00 |
| 18 in. and over | 56.00 |

Basic open hearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham.

Prices delivered Detroit are $2.25 higher.

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting to length, or quantity.

### *Sheet Bars*

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

| | *Per Gross Ton* |
|---|---|
| Open hearth or bessemer | $34.00 |

### *Skelp*

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

| | *Per Lb.* |
|---|---|
| Grooved, universal and sheared | 1.90c. |

### *Wire Rods*

*(No. 5 to 9/32 in.)*

| | *Per Lb.* |
|---|---|
| Pittsburgh, Chicago, Cleveland | 2.00c. |
| Worcester, Mass. | 2.10c. |
| Birmingham | 2.00c. |
| San Francisco | 2.50c. |
| Galveston | 2.25c. |

9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

### *Alloy Steel Blooms, Billets and Slabs*

Pittsburgh, Chicago, Canton, Massillon, Buffalo, or Bethlehem, per gross ton ..... $54.00

## TOOL STEEL

*(F.o.b. Pittsburgh, Bethlehem, Syracuse)*

| | *Base per Lb.* |
|---|---|
| High speed | 67c. |
| Straight molybdenum | 54c. |
| Tungsten-molybdenum | 57½c. |
| High-carbon-chromium | 43c. |
| Oil hardening | 24c. |
| Special carbon | 22c. |
| Extra carbon | 18c. |
| Regular carbon | 14c. |

Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi, 3c. higher.

## CORROSION AND HEAT-RESISTING STEEL

*(Per lb. base price, f.o.b. Pittsburgh)*

### *Chromium-Nickel Alloys*

| | No. 304 | No. 302 |
|---|---|---|
| Forging billets | 21.25c. | 20.40c. |
| Bars | 25.00c. | 24.00c. |
| Plates | 29.00c. | 27.00c. |
| Structural shapes | 25.00c. | 24.00c. |
| Sheets | 36.00c. | 34.00c. |
| Hot rolled strip | 23.50c. | 21.50c. |
| Cold rolled strip | 30.00c. | 28.00c. |
| Drawn wire | 25.00c. | 24.00c. |

### *Straight-Chromium Alloys*

| | No. 410 | No. 430 | No. 442 | No. 446 |
|---|---|---|---|---|
| F.Billets | 15.725c. | 16.15c. | 19.125c. | 23.375c. |
| Bars | 18.50c. | 19.00c. | 22.50c. | 27.50c. |
| Plates | 21.50c. | 22.00c. | 25.50c. | 30.50c. |
| Sheets | 26.50c. | 29.00c. | 32.50c. | 36.50c. |
| Hotstrip | 17.00c. | 17.50c. | 24.00c. | 35.00c. |
| Cold st. | 22.00c. | 22.50c. | 32.00c. | 52.00c. |

### *Chromium-Nickel Clad Steel (20%)*

| | No. 304 |
|---|---|
| Plates | 18.00c.* |
| Sheets | 19.00c. |

*Includes annealing and pickling.

## PIG IRON

All prices set in bold face type are maxima established by OPA on June 24, 1941. Other domestic prices (in italics) are delivered quotations per gross ton computed on the basis of the official maxima.

| | No. 2 Foundry | Basic | Bessemer | Malleable | Low Phosphorus | Charcoal |
|---|---|---|---|---|---|---|
| Boston†† | *$25.53* | *$25.03* | *$26.53* | *$26 03* | ..... | ..... |
| Brooklyn | *27.65* | ..... | ..... | *28.15* | ..... | ..... |
| Jersey City | *26.62* | *26.12* | *27 62* | *27.12* | ..... | ..... |
| Philadelphia | *25.89* | *25.39* | *26.89* | *26.39* | ..... | ..... |
| Bethlehem, Pa. | $25.00 | $24.50 | $26.00 | $25.50 | ..... | ..... |
| Everett, Mass.†† | 25.00 | 24.50 | 26.00 | 25.50 | ..... | ..... |
| Swedeland, Pa. | 25.00 | 24.50 | 26.00 | 25.50 | ..... | ..... |
| Steelton, Pa. | ..... | 24.50 | ..... | ..... | $29.50 | ..... |
| Birdsboro, Pa. | 25.00 | 24.50 | 26.00 | 25.50 | 29.50 | ..... |
| Sparrows Point, Md. | 25.00 | 24.50 | ..... | ..... | ..... | ..... |
| Erie, Pa. | 24.00 | 23.50 | 25.00 | 24.50 | ..... | ..... |
| Neville Island, Pa. | 24.00 | 23.50 | 24.50 | 24.00 | ..... | ..... |
| Sharpsville, Pa.* | 24.00 | 23.50 | 24.50 | 24.00 | ..... | ..... |
| Buffalo | 24.00 | 23.00 | 25.00 | 24.50 | 29.50 | ..... |
| Cincinnati | *24.68* | *24.68* | ..... | *25.18* | ..... | ..... |
| Canton, Ohio | *25.47* | *24.97* | *25.97* | *25.47* | ..... | ..... |
| Mansfield, Ohio | *26.06* | *25.56* | *26.56* | *26.06* | ..... | ..... |
| St. Louis | *24.50* | *24.00* | ..... | ..... | ..... | ..... |
| Chicago | 24.00 | 23.50 | 24.50 | 24.00 | ..... | *$31.34* |
| Granite City, Ill. | 24.00 | 23.50 | 24.50 | 24.00 | ..... | ..... |
| Cleveland | 24.00 | 23.50 | 24.50 | 24.00 | ..... | ..... |
| Hamilton, Ohio | 24.00 | 23.50 | ..... | 24.00 | ..... | ..... |
| Toledo | 24.00 | 23.50 | 24.50 | 24.00 | ..... | ..... |
| Youngstown* | 24.00 | 23.50 | 24.50 | 24.00 | ..... | ..... |
| Detroit | 24.00 | 23.50 | 24.50 | 24.00 | ..... | ..... |
| Lake Superior fc. | ..... | ..... | ..... | ..... | ..... | $28.00 |
| Lyles, Tenn. fc.† | ..... | ..... | ..... | ..... | ..... | 33.00 |
| St. Paul | *26.76* | ..... | *27.26* | *26.76* | ..... | ..... |
| Duluth | 24.50 | ..... | 25.00 | 24.50 | ..... | ..... |
| Birmingham | 20.38 | 19.00 | 25.00 | ..... | ..... | ..... |
| Los Angeles | *27.25* | ..... | ..... | ..... | ..... | ..... |
| San Francisco | *27.25* | ..... | ..... | ..... | ..... | ..... |
| Seattle | *27.25* | ..... | ..... | ..... | ..... | ..... |
| Provo, Utah | 22.00 | ..... | ..... | ..... | ..... | ..... |
| Montreal | *27.50* | *27.50* | ..... | *28.00* | ..... | ..... |
| Toronto | *25.50* | *25.50* | ..... | *26.00* | ..... | ..... |

**GRAY FORGE IRON:** Valley or Pittsburgh furnace ..... $23.50

*Pittsburgh Coke & Iron Co. (Sharpsville, Pa. furnace only) and the Struthers Iron and Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

†Price shown is for low-phosphorous iron; high-phosphorous sells for $28.50 at the furnace.

††Eastern Gas & Fuel Associates, Boston, is permitted to sell pig iron produced by its selling company, Mystic Iron Works, Everett, Mass., at $1 per gross ton above maximum prices.

**Switching Charges:** Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

**Silicon Differentials:** Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade (1.75 per cent to 2.25 per cent).

**Phosphorous Differential:** Basing point prices are subject to a reduction of 38c. per ton for phosphorous content of 0.70 per cent and over.

**Manganese Differentials:** Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.50 per cent manganese content in excess of 1.00 per cent.

## NATIONAL EMERGENCY STEELS (Hot Rolled)

***Extras for Alloy Content***

| Designation | CHEMICAL COMPOSITION LIMITS, PER CENT | | | | | | | | | Basic Open-Hearth | | Electric Furnace | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Carbon | Manganese | Phosphorus Max. | Sulphur Max. | Silicon | Nickel | Chromium | Molybdenum | Vanadium | Bars & Bar-Strip | Billets, Blooms, & Slabs | Bars & Bar-Strip | Billets, Blooms, & Slabs |
| NE 8024 | .22/.28 | 1.00/1.30 | .040 | .040 | .20/.35 | ..... | ..... | .10/.20 | ..... | .45c | $ 9.00 | .95c | $19.00 |
| NE 8124 | .22/.28 | 1.30/1.60 | .040 | .040 | .20/.35 | ..... | ..... | .25/.35 | ..... | .85 | 17.00 | 1.35 | 27.00 |
| NE 8233 | .30/.36 | 1.30/1.60 | .040 | .040 | .20/.35 | ..... | ..... | .10/.20 | ..... | .65 | 13.00 | 1.15 | 23.00 |
| NE 8245 | .42/.49 | 1.30/1.60 | .040 | .040 | .20/.35 | ..... | ..... | .10/.20 | ..... | .65 | 13.00 | 1.15 | 23.00 |
| NE 8339 | .35/.42 | 1.30/1.60 | .040 | .040 | .20/.35 | ..... | ..... | .20/.30 | ..... | .75 | 15.00 | 1.25 | 25.00 |
| NE 8442 | .38/.45 | 1.30/1.60 | .040 | .040 | .20/.35 | ..... | ..... | .30/.40 | ..... | .90 | 18.00 | 1.40 | 28.00 |
| NE 8447 | .43/.50 | 1.30/1.60 | .040 | .040 | .20/.35 | ..... | ..... | .30/.40 | ..... | .90 | 18.00 | 1.40 | 28.00 |
| NE 8547 | .43/.50 | 1.30/1.60 | .040 | .040 | .20/.35 | ..... | ..... | .40/.60 | ..... | 1.25 | 25.00 | 1.75 | 35.00 |
| NE 8620 | .18/.23 | .70/.95 | .040 | .040 | .20/.35 | .40/.60 | .40/.60 | .15/.25 | ..... | .75 | 15.00 | 1.25 | 25.00 |
| NE 8630 | .27/.33 | .70/.95 | .040 | .040 | .20/.35 | .40/.60 | .40/.60 | .15/.25 | ..... | .75 | 15.00 | 1.25 | 25.00 |
| NE 8724 | .22/.28 | .70/.95 | .040 | .040 | .20/.35 | .40/.60 | .40/.60 | .20/.30 | ..... | .80 | 16.00 | 1.30 | 26.00 |
| NE 8739 | .35/.42 | .75/1.00 | .040 | .040 | .20/.35 | .40/.60 | .40/.60 | .20/.30 | ..... | .80 | 16.00 | 1.30 | 26.00 |
| NE 8744 | .40/.47 | .75/1.00 | .040 | .040 | .20/.35 | .40/.60 | .40/.60 | .20/.30 | ..... | .80 | 16.00 | 1.30 | 26.00 |
| NE 8749 | .45/.52 | .75/1.00 | .040 | .040 | .20/.35 | .40/.60 | .40/.60 | .20/.30 | ..... | .80 | 16.00 | 1.30 | 26.00 |
| NE 8817 | .15/.20 | .70/.95 | .040 | .040 | .20/.35 | .40/.60 | .40/.60 | .30/.40 | ..... | .90 | 18.00 | 1.40 | 28.00 |
| NE 8949 | .45/.52 | 1.00/1.30 | .040 | .040 | .20/.35 | .40/.60 | .40/.60 | .30/.40 | ..... | 1.20 | 24.00 | 1.70 | 34.00 |

**Note: The extras shown above are in addition to a base price of 2.70c. per 100 lb.. on finished products and $54. per gross ton on semi-finished steel major basing points and are in cents per 100 lb. and dollars per gross ton in semi-finished.**

# Tanks are Forgings

Tough, stress resistant forgings — parts that must withstand the most grueling punishment and service abuse — are essential in large quantities for the light, medium and heavy tanks now in production.

Because of the wider use of forgings, American-made tanks excel. They are faster, superior fighters, better able to withstand and "dish-out" blitz warfare.

Beating plow-shares into swords, making forgings for tank transmissions, engines, crawlers, guns and other operating parts is our daily job.

Ever more rough and finished parts of this type flow from under our hammers as the tempo of war production in our shops increases.

While our facilities today are heavily taxed, we still have the desire and the ability to serve more builders of tanks, ships, planes, guns, machine tools and ordnance.

A quick termination of totalitarian ambitions will speed the day when free men can follow normal pursuits. We are doing our part to help speed that day.

*Proudly we fly the Navy "E" flag awarded for excellence and proficiency in the production of Naval Materiel.*

## KROPP FORGE COMPANY

Makers of Drop, Upset and Hammer Forgings for Guns, Planes, Tanks, Ships, Ordnance and Machine Tools

"World's Largest Job Forging Shop"

5301 W. ROOSEVELT ROAD, CHICAGO, IL.

*Representatives in Principal Cities*

SERVING INDUSTRY SINCE 18 37 OVER 100 YEARS

K

KROPP FORGE CO.

KROPP

## ELECTRICAL SHEETS

*(Base, f.o.b. Pittsburgh)*

| | Per Lb. |
|---|---|
| Field grade | 3.20c. |
| Armature | 3.55c. |
| Electrical | 4.05c. |
| Motor | 4.95c. |
| Dynamo | 5.65c. |
| Transformer 72 | 6.15c. |
| Transformer 65 | 7.15c. |
| Transformer 58 | 7.65c. |
| Transformer 52 | 8.45c. |

F.o.b. Granite City, add 10c. per 100 lb. on field grade to and including dynamo. Pacific ports add 75c. per 100 lb. on all grades.

## WIRE PRODUCTS

*To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham*

| | Base per Keg |
|---|---|
| Standard wire nails | $2.55 |
| Coated nails | 2.55 |
| Cutnails, carloads | 3.85 |
| | *Base per 100 Lb.* |
| Annealed fence wire | $3.05 |
| Annealed galvanized fence wire | 3.40 |
| | *Base Column* |
| Woven wire fence* | 67 |
| Fence posts (carloads) | 69 |
| Single loop bale ties | 59 |
| Galvanized barbed wire† | 70 |
| Twisted barbless wire | 70 |

*15½ gage and heavier. †On 80-rod spools in carload quantities.

## ROOFING TERNE PLATE

*(F.o.b. Pittsburgh, per Package of 112 Sheets)*

| | 20x14 in. | 20x28 in. |
|---|---|---|
| 8-lb. coating I.C. | $6.00 | $12.00 |
| 15-lb. coating I.C. | 7.00 | 14.00 |
| 20-lb. coating I.C. | 7.50 | 15.00 |
| 25-lb. coating I.C. | 8.00 | 16.00 |
| 30-lb. coating I.C. | 8.63 | 17.25 |
| 40-lb. coating I.C. | 9.75 | 19.50 |

## BOLTS, NUTS, RIVETS, SET SCREWS

***Bolts and Nuts***

*(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)*

| Machine and Carriage Bolts: | Per Cent off List |
|---|---|
| ½ in. & smaller x 6 in. & shorter | 65½ |
| 9/16 & ⅝ in. x 6 in. & shorter | 63½ |
| ¾ to 1 in. x 6 in. & shorter | 61 |
| 1⅛ in. and larger, all length | 59 |
| All diameters over 6 in. long | 59 |
| Lag, all sizes | 62 |
| Plow bolts | 65 |

| Nuts, Cold Punched or Hot Pressed: (Hexagon or Square) | |
|---|---|
| ½ in. and smaller | 62 |
| 9/16 to 1 in. inclusive | 59 |
| 1⅛ to 1½ in. inclusive | 57 |
| 1⅝ in. and larger | 56 |

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

| Semi-Fin. Hexagon Nuts | U.S.S. | S.A.E. |
|---|---|---|
| 7/16 in. and smaller | .. | 64 |
| ½ in. and smaller | 62 | .. |
| ½ in. through 1 in. | .. | 60 |
| 9/16 to 1 in. | 59 | .. |
| 1⅛ in. through 1½ in. | 57 | 58 |
| 1⅝ in. and larger | 56 | .. |

In full container lots, 10 per cent additional discount.

Stove bolts, packages, nuts loose 71 and 10

Stove bolts in packages, with nuts attached 71

Stove bolts in bulk 80

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York on lots of 200 lb. or over.

***Large Rivets*** *(½ in. and larger)*

*Base per 100 lb.*

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham $3.75

***Small Rivets*** *(7/16 in. and smaller)*

*Per Cent Off List*

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham 65 and 5

***Cap and Set Screws*** *Per Cent Off List*

| | |
|---|---|
| Upset full fin. hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in. | 64 |
| Upset set screws, cup and oval points | 71 |
| Milled studs | 46 |
| Flat head cap screws, listed sizes | 36 |
| Filister head cap, listed sizes | 51 |

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

## PIPE AND TUBING

***Welded Pipe***

*Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills*

*(F.o.b. Pittsburgh only on wrought pipe)*

*Base Price—$200 per Net Ton*

| Steel (Butt Weld) | Black | Galv. |
|---|---|---|
| ½ in. | 63½ | 51 |
| ¾ in. | 66½ | 55 |
| 1 to 3 in. | 68½ | 57½ |
| **Wrought Iron (Butt Weld)** | | |
| ½ in. | 24 | 3½ |
| ¾ in. | 30 | 10 |
| 1 and 1¼ in. | 34 | 16 |
| 1½ in. | 38 | 18½ |
| 2 in. | 37½ | 18 |
| **Steel (Lap Weld)** | | |
| 2 in. | 61 | 49½ |
| 2½ and 3 in. | 64 | 52½ |
| 3½ to 6 in. | 66 | 54½ |
| **Wrought Iron (Lap Weld)** | | |
| 2 in. | 30½ | 12 |
| 2½ to 3½ in. | 31½ | 14½ |
| 4 in. | 33½ | 18 |
| 4½ to 8 in. | 32½ | 17 |
| **Steel (Butt, extra strong, plain ends)** | | |
| ½ in. | 61½ | 50½ |
| ¾ in. | 65½ | 54½ |
| 1 to 3 in. | 67 | 57 |
| **Wrought Iron (Same as Above)** | | |
| ½ in. | 25 | 6 |
| ¾ in. | 31 | 12 |
| 1 to 2 in. | 38 | 19½ |
| **Steel (Lap, extra strong, plain ends)** | | |
| 2 in. | 59 | 48½ |
| 2½ and 3 in. | 63 | 52½ |
| 3½ to 6 in. | 66½ | 56 |
| **Wrought Iron (Same as Above)** | | |
| 2 in. | 33½ | 15½ |
| 2½ to 4 in. | 39 | 22½ |
| 4½ to 6 in. | 37½ | 21 |

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or $2 a ton higher on all butt weld.

## WAREHOUSE PRICES

*(Delivered Metropolitan areas, per 100 lb. These prices do not necessarily apply for dislocated tonnage shipments when the f.o.b. City prices are used in conformance with OPA Schedule 49)*

| CITIES | SHEETS | | | STRIP | | Plates (¼ in. and heavier) | Structural Shapes | BARS | | ALLOY BARS | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Hot Rolled (10 ga.) | Cold Rolled | Galv. (24 ga.) | Hot Rolled | Cold Rolled | | | Hot Rolled | Cold Finished | Hot Rolled 2300 | Hot Rolled 3100 | Cold Drawn 2300 | Cold Drawn 3100 |
| Pittsburgh | $3.35 | .... | $4.65 | $3.60 | $3.20 | $3.40 | $3.40 | $3.35 | $3.65 | $7.45 | $5.75 | $8.40 | $6.75 |
| Chicago | 3.25 | 4.10 | 4.85[1] | 3.60 | 3.50 | 3.55 | 3.55 | 3.50 | 3.75 | 7.35 | 5.65 | 8.40 | 6.75 |
| Cleveland | 3.35 | 4.05 | 4.62 | 3.50 | 3.20 | 3.40 | 3.58 | 3.25 | 3.75 | 7.55 | 5.85 | 8.40 | 6.75 |
| Philadelphia | 3.55 | 4.05[5] | 4.65 | 3.51 | 3.31 | 3.55 | 3.55 | 3.85 | 4.06 | 7.31 | 5.86 | 8.56 | 7.16 |
| New York | 3.58 | 4.60[2] | 5.00 | 3.96[6] | 3.51 | 3.76 | 3.75 | 3.84 | 4.09 | 7.60 | 5.90 | 8.84 | 7.19 |
| Detroit | 3.43 | 4.30 | 4.84[1] | 3.68* | 3.40 | 3.60 | 3.65 | 3.43 | 3.80 | 7.67 | 5.97 | 8.70 | 7.05 |
| Buffalo | 3.25 | 4.30[1] | 4.75[4] | 3.82 | 3.52 | 3.62 | 3.40 | 3.35 | 3.75 | 7.35 | 5.65 | 8.40 | 6.75 |
| Boston | 3.71 | 4.68 | 5.11 | 4.06 | 3.46 | 3.85 | 3.85 | 3.98 | 4.13 | 7.75 | 6.05 | 8.88 | 7.23 |
| Birmingham | 3.45[3] | .... | 4.75[1] | 3.70[3] | .... | 3.55[3] | 3.55[3] | 3.50[3] | 4.48 | .... | .... | .... | .... |
| St. Louis | 3.39 | 4.24[2] | 4.99[1] | 3.74 | 3.61 | 3.69 | 3.69 | 3.64 | 4.02 | 7.72 | 6.02 | 8.77 | 7.12 |
| St. Paul | 3.50 | 4.35 | 5.00 | 3.85 | 3.83 | 3.80 | 3.80 | 3.75 | 4.34 | 7.45 | 6.00 | 8.84 | 7.44 |
| Milwaukee | 3.38 | 4.23[2] | 4.98[1] | 3.73 | 3.54 | 3.68 | 3.68 | 3.63 | 3.88 | 7.58 | 5.88 | 8.63 | 6.98 |
| Baltimore | 3.50 | .... | 5.05 | 4.00 | .... | 3.70 | 3.70 | 3.85 | 4.04 | .... | .... | .... | .... |
| Cincinnati | 3.42 | 4.37[2] | 4.42[1] | 3.67 | 3.45 | 3.65 | 3.68 | 3.60 | 4.00 | 7.69 | 5.99 | 8.50 | 7.10 |
| Norfolk | 3.85 | .... | 5.40 | 4.10 | .... | 4.05 | 4.05 | 4.00 | 4.15 | .... | .... | .... | .... |
| Washington | 3.60 | .... | .... | 4.10 | .... | 3.90 | 3.80 | 3.95 | 4.10 | .... | .... | .... | .... |
| Indianapolis | 3.45 | 4.25 | 5.01[1] | 3.75 | 3.28 | 3.70 | 3.70 | 3.60 | 3.97 | 7.67 | 5.97 | 8.72 | 7.07 |
| Omaha | 3.85 | .... | 5.52[1] | 4.20 | .... | 4.15 | 4.15 | 4.10 | 4.42 | .... | .... | .... | .... |
| Memphis | 3.85 | .... | 5.25 | 4.10 | .... | 3.95 | 3.95 | 3.90 | 4.31 | .... | .... | .... | .... |
| New Orleans | 4.05 | .... | .... | 4.30 | .... | 3.90 | 3.90 | 4.10 | 4.60 | .... | .... | .... | .... |
| Houston | 4.00 | .... | .... | 4.30 | .... | 4.05 | 4.05 | 3.75 | .... | .... | .... | .... | .... |
| Los Angeles † | 4.95 | 7.15 | 5.95 | 4.90 | .... | 4.90 | 4.60 | 4.35 | 6.60 | 9.55 | 8.55 | 10.55 | 9.55 |
| San Francisco† | 4.55 | 7.05 | 6.10 | 4.50 | .... | 4.65 | 4.35 | 3.95 | 6.80 | 9.80 | 8.80 | 10.80 | 9.80 |
| Seattle† | 4.65[7] | .... | 5.70[7] | 4.25 | .... | 4.75 | 4.45 | 4.20 | 5.75 | .... | 9.00 | .... | .... |

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb., galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities: cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions: [1] 500 to 1499 lb. [2] 400 to 1499 lb. [3] 400 to 3999 lb. [4] 450 to 1499 lb. [5] 1000 to 1999 lb. [6] 0 to 1999 lb. [7] 300 to 10,000 lb. At Philadelphia galvanized sheets, 25 or more bundles; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; San Francisco, hot rolled sheets, 400 to 39,999 lb., galvanized and cold rolled sheets, 750 to 4999 lb., cold fin. bars, 0-299 lb.; hot rolled alloy bars, 0-4999 lb.; Seattle, cold finished bars, 1000 lb. and over, hot rolled alloy bars, 0-1999 lb.; Memphis, hot rolled sheets, 400 to 1999 lb., galvanized sheets, 150 and over; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb.; Los Angeles, hot rolled sheets, bars, plates, cold rolled sheets, 300 to 1999 lb.; galvanized sheets, 1 to 6 bundles; cold finished bars, 1 to 99 lb.; SAE bars, 100 lb. Extras for size, quality, etc., apply on above quotations. * 12 gage and heavier, $3.43. †Los Angeles, San Francisco and Seattle prices reflect special provisions of amendment No. 2 to OPA Price Schedule No. 49.

# DIE CAST BOUCHONS FOR HAND GRENADES

The bouchon is "the business end" of a grenade.

The well-known fragmentation "pineapples" which served our fighting men so well in World War I are equipped, in this war, with ZINC Alloy Die Cast bouchons. This part is particularly well adapted to die casting production because in its detail it constitutes a rather tricky design and, as a die casting, it can be turned out at high speed with practically no machining.

The three steps in the above illustration show (1) the die cast bouchon (2) the bouchon with the booster assembled at the bottom and with the spring firing cap at the top (3) a complete grenade with the release handle and the release ring-pin assembled to the bouchon.

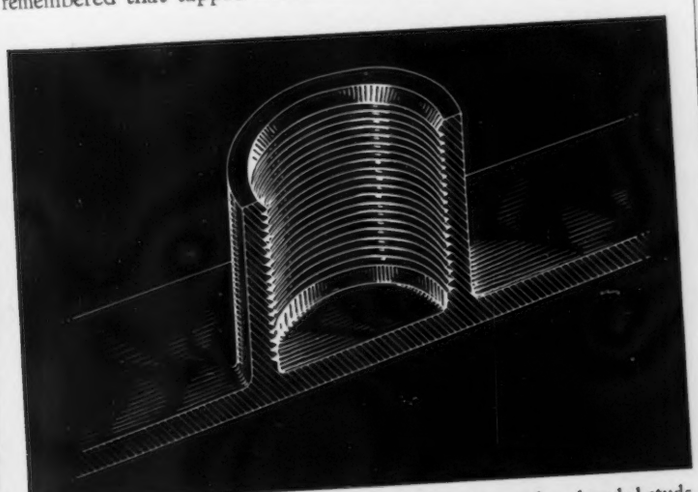
As shown in the inset, the soldier first removes the pin by pulling the ring (in this case with his teeth). This permits the release handle to fly off when the grenade is thrown, springing the firing cap to its charge in the bouchon and thence through the booster to the deadly T.N.T.

# TAPPED BOSSES PROVIDE STRENGTH

In designing a part for production by die casting it should be remembered that tapped bosses are stronger than threaded studs (because external threads cause a notch effect in case of shock loads).

With tapped bosses, however, the precaution must be taken to allow 1/8" at the bottom for chip clearance (see drawing). Failure to provide this clearance in any one boss may add as much as 5% to the cost of the casting, through frequent tap breakage. In addition, a tapped hole should be counter sunk 1/32" larger than the thread for ease of tapping an assembly.

For other hints on good die casting design practice, write to us—on your company letterhead—for a copy of the booklet "Designing for Die Casting."



Tapped bosses are always preferable, and often as economical as threaded studs.

# THE New Jersey zinc° ALLOY POT

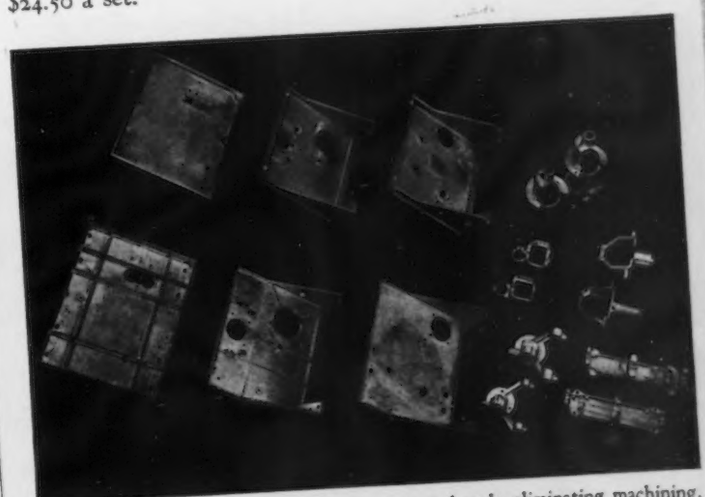
A publication issued for many years by The New Jersey Zinc Company to report on trends and accomplishments in the field of die castings. Title Reg. U. S. Pat. Off.

IRON AGE EDITION

# ZINC ALLOY DIE CASTINGS VS. SAND CASTINGS

In the redesigning of many products, die castings have been adopted to serve where sand castings were previously employed. The reason for this conversion is usually one of simple arithmetic.

Shown below are eight sand-casting-to-die-casting conversions of parts for a navigation training device used in the aviation field. The sand castings, at the background in each case, cost $8.44 for a set of eight. The ZINC Alloy Die Castings, foreground, cost $3.43 a set. In addition, it cost $33.64 to machine the sand castings and only $14.15 to machine the die castings. Thus the total saving on the redesign of the eight castings effected a total saving of $24.50 a set.



Design complexity was achieved by die casting, largely eliminating machining.

THE NEW JERSEY ZINC COMPANY 160 FRONT ST., NEW YORK CITY
HORSE HEAD SPECIAL ( 99.99 + % Uniform Quality ) ZINC

## BOILER TUBES

*Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes Minimum Wall*
*(Net base prices per 100 ft., f.o.b. Pittsburgh, in carload lots)*

| | Seamless Cold Drawn | Hot Rolled | Lap Weld, Hot Rolled |
|---|---|---|---|
| | $ | $ | $ |
| 2 in. o.d. 13 B.W.G. | 15.03 | 13.04 | 12.38 |
| 2½ in. o.d. 12 B.W.G. | 20.21 | 17.54 | 16.58 |
| 3 in. o.d. 12 B.W.G. | 22.48 | 19.50 | 18.35 |
| 3½ in. o.d. 11 B.W.G. | 28.37 | 24.62 | 23.15 |
| 4 in. o.d. 10 B.W.G. | 35.20 | 30.54 | 28.66 |

*(Extras for less carload quantities)*

| | |
|---|---|
| 40,000 lb. or ft. over | Base |
| 30,000 lb. or ft. to 39,999 lb. or ft. | 5% |
| 20,000 lb. or ft. to 29,999 lb. or ft. | 10% |
| 10,000 lb. or ft. to 19,999 lb. or ft. | 20% |
| 5,000 lb. or ft. to 9,999 lb. or ft. | 30% |
| 2,000 lb. or ft. to 4,999 lb. or ft. | 45% |
| Under 2,000 lb. or ft. | 65% |

## CAST IRON WATER PIPE

| | *Per Net Ton* |
|---|---|
| 6-in. and larger, del'd Chicago | $54.80 |
| 6-in. and larger, del'd New York | 52.20 |
| 6-in. and larger, Birmingham | 46.00 |
| 6-in. and larger f.o.b. cars, San Francisco or Los Angeles | 69.40 |
| 6-in. and larger f.o.b. cars, Seattle | 71.20 |

Class "A" and gas pipe, $3 extra; 4-in. pipe is $3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger is $45 at Birmingham and $53.80 delivered Chicago. $59.40 at San Francisco and Los Angeles, and $70.20 at Seattle.

## RAILS, TRACK SUPPLIES

*(F.o.b. Mill)*

| | |
|---|---|
| Standard rails, heavier than 60 lb., gross ton | $40.00 |
| Angle bars, 100 lb. | 2.70 |
| *(F.o.b. Basing Points)* | *Per Gross Ton* |
| Light rails (from billets) | $40.00 |
| Light rails (from rail steel) | 39.00 |
| | *Base per Lb.* |
| Cut spikes | 3.00c. |
| Screw spikes | 5.15c. |
| Tie plates, steel | 2.15c. |
| Tie plates, Pacific Coast | 2.30c. |
| Track bolts | 4.75c. |
| Track bolts, heat treated, to railroads | 5.00c. |
| Track bolts, jobbers discount | 60-5 |

Basing Points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond

## FERROALLOYS

### *Ferromanganese*

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans, Domestic, 80%, per gross ton (carloads) ..... $135.00

### *Spiegeleisen*

*Per Gross Ton Furnace*

| | |
|---|---|
| Domestic, 19 to 21% | $36.00 |
| Domestic, 26 to 28% | 49.50 |

### *Electric Ferrosilicon*

*(Per Gross Ton, Delivered Lump Size)*

| | |
|---|---|
| 50% (carload lots, bulk) | $74.50 |
| 50% (ton lots, packed) | 87.00 |
| 75% (carload lots, bulk) | 135.00 |
| 75% (ton lots, packed) | 151.00 |

### *Silvery Iron*

*(Per Gross Ton, base 6.00 to 6.50 Si)*

F.o.b. Jackson, Ohio ..... $29.50*
Buffalo ..... 30.75*
For each additional 0.50% silicon add $1 a ton. For each 0.50% manganese over 1% add 50c. a ton. Add $1 a ton for 0.75% phosphorus or over.
*Official OPA price established June 24, 1941.

### *Bessemer Ferrosilicon*

Prices are $1 a ton above Silvery Iron quotations of comparable analysis.

### *Ferrochrome*

*(Per Lb., Contained Cr, Delivered Carlots, Lump Size, on Contract)*

| | |
|---|---|
| 4 to 6 carbon | 13.00c. |
| 2 carbon | 19.50c. |
| 1 carbon | 20.50c. |
| 0.10 carbon | 22.50c. |
| 0.06 carbon | 23.00c. |

Spot prices are ¼c. per lb. of contained chromium higher.

### *Silico-Manganese*

*(Per Gross Ton, Delivered, Lump Size, Bulk, on Contract)*

| | |
|---|---|
| 3 carbon | $113.00* |
| 2.50 carbon | 118.00* |
| 2 carbon | 123.00* |
| 1 carbon | 133.00* |

### *Other Ferroalloys*

| | |
|---|---|
| Ferrotungsten, per lb. contained W, del'd carload | $2.00 |
| Ferrotungsten, 100 lb. and less | 2.25 |
| Ferrovanadium, contract, per lb. contained V, del'd | $2.70 to $2.90† |
| Ferrocolumbium, per lb. contained Cb, f.o.b. Niagara Falls, N. Y., ton lots | $2.25† |
| Ferrocarbontitanium, 15-18 Ti, 7-8 C, f.o.b. furnace, carload contract, net ton | $142.50 |
| Ferrocarbontitanium, 17-20 Ti, 3-5 C, f.o.b. furnace, carload contract, net ton | $157.50 |
| Ferrophosphorus, electric or blast furnace materials, carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage freight, equaled with Rockdale, Tenn., gross ton | $58.50 |
| Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., $3 unitage, freight equalized with Nashville, gross ton | $75.00 |
| Ferromolybdenum, per lb., Mo, f.o.b. furnace | 95c. |
| Calcium molybdate, per lb. Mo., f.o.b. furnace | 80c. |
| Molybdenum oxide briquettes 48-52 Mo, per lb. contained Mo, f.o.b. Langeloth, Pa. | 80c. |
| Molybdenum oxide, in cans, per lb. contained Mo, f.o.b. Langeloth, and Washington, Pa. | 80c. |

*Spot prices are $5 per ton higher.
†Spot prices are 10c. per lb. of contained element higher.

## FLUORSPAR

| *Fire Clay Brick* | *Per Net Ton* |
|---|---|
| Domestic washed gravel, 85-5 f.o.b. Kentucky and Illinois mines, all rail | $25.00 |
| Domestic, f.o.b. Ohio River landing barges | 25.00 |
| No. 2 lump, 85-5 f.o.b. Kentucky and Illinois mines | 25.00 |
| Foreign, 85% calcium fluoride, not over 5% Ci, c.i.f. Atlantic ports, duty paid | Nominal |
| Domestic No. 1 ground bulk, 95 to 98%, calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines | $34.00 |
| As above, in bags, f.o.b. same mines | 36.40 |

## REFRACTORIES

*(F.o.b. Works)*

### *Fire Clay Brick*

| | *Per 1000* |
|---|---|
| Super-duty brick, St. Louis | $64.60 |
| First quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois | 51.30 |
| First quality, New Jersey | 56.00 |
| Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois | 46.55 |
| Second quality, New Jersey | 51.00 |
| No. 1, Ohio | 43.00 |
| Ground fire clay, net ton | 7.60 |

### *Silica Brick*

| | |
|---|---|
| Pennsylvania | $51.30 |
| Chicago District | 58.90 |
| Birmingham | 51.30 |
| Silica cement, net ton (Eastern) | 9.00 |

### *Chrome Brick*

| | *Per Net Ton* |
|---|---|
| Standard, f.o.b. Baltimore, Plymouth Meeting and Chester | $54.00 |
| Chemically bonded, f.o.b. Baltimore, Plymouth Meeting and Chester Pa. | 54.00 |

### *Magnesite Brick*

| | |
|---|---|
| Standard f.o.b. Baltimore and Chester | $76.00 |
| Chemically bonded, f.o.b. Baltimore | 65.00 |

### *Grain Magnesite*

| | |
|---|---|
| Domestic, f.o.b. Baltimore and Chester in sacks (carloads) | $44.00 |
| Domestic, f.o.b. Chewelah, Wash. (in bulk) | 22.00 |

## ORES

### *Lake Superior Ores (51.50% Fe.)*

*(Delivered Lower Lake Ports)*

| | *Per Gross Ton* |
|---|---|
| Old range, bessemer, 51.50 | $4.75 |
| Old range, non-bessemer, 51.50 | 4.60 |
| Mesaba, bessemer, 51.50 | 4.60 |
| Mesaba, non-bessemer, 51.50 | 4.45 |
| High phosphorus, 51.50 | 4.35 |

### *Foreign Ores**

*(C.i.f. Philadelphia or Baltimore, Exclusive of Duty)*

| | *Per Unit* |
|---|---|
| African, 46-48 Mn | 70c.-75c. |
| Indian, 48-50 Mn | 75c. |
| Brazilian, 46-48 Mn | 81c. to 83c. |
| Cuban, 51 Mn | 85c. |
| | *Per Short Ton Unit* |
| Tungsten, Chinese, Wolframite, duty paid, delivered | $24 to $26 |
| Tungsten, domestic scheelite, at mine | $24 to $25 |
| Chrome ore, lump, c.i.f. Atlantic Seaboard, per gross ton; South African (low grade) | $28 to $30 |
| Rhodesian, 45 | Nom. |
| Rhodesian, 48 | Nom. |

*Importations no longer readily available. Prices shown are nominal.

## COKE*

### *Furnace*

| | *Per Net Ton* |
|---|---|
| †Connellsville, prompt | $6.00 |

### *Foundry*

†Connellsville, prompt ... $6.75 to $7.00

*Maximum by-product coke prices established by OPA became effective Oct. 1, 1941. A complete schedule of the ceiling prices was published in THE IRON AGE, Sept. 25, p. 94B. Maximum beehive furnace coke prices established by OPA, Jan. 26. †F.O.B. oven.

| | |
|---|---|
| By-product, Chicago | $12.25 |
| By-product, New England | $13.75 |
| By-product, Newark | $12.40 to $12.95 |
| By-product, Philadelphia | $12.38 |
| By-product, Cleveland | $12.30 |
| By-product, Cincinnati | $11.75 |
| By-product, Birmingham | $8.50† |
| By-product, St. Louis | $12.02 |
| By-product, Buffalo | $12.50 |

## FUEL OIL

| | |
|---|---|
| No. 6 Bur. Stsd., del'd Chicago | 4.75c. |
| No. 3 distillate del'd Cleveland | 6.50c. |
| No. 4 indus., del'd Cleveland | 6.00c. |
| No. 5 indus., del'd Cleveland | 5.25c. |
| No. 6 indus., del'd Cleveland | 5.25c. |